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W. R. JILLSON, State Geologist

THE GEOLOGY AND COALS OF STINKING CREEK

(Knox County, Ky.)

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Illustrated with Fifteen Photographs, Maps and Diagrams.

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PREFACE

There are still many very large areas in the coal fields of Eastern Kentucky which have seen little or no development. These areas have not always been intentionally passed or overlooked by the operator because of lesser coal values. On the contrary, some of the best coal of any region are those which, because of lack of convenient railroad connections, have enjoyed a peculiar traffic isolation even through those times of the most expanding operations. Such a region of the fine coals is that embraced within the drainage boundaries of Stinking Creek, and a few adjoining lesser tributaries of the Cumberland River from Flat Lick to Barbourville, Knox County, Southeastern Kentucky.

Many rapid changes in the direction and the rate of dip of the strata along the Cumberland River in this region, and the absence of thick coals in the immediate vicinity have resulted in obscuring the stratigraphy and the sequence of coals of this section. As a matter of fact, if it were not for the numerous new coal openings which were made by investigating operators during the progress of the field work on which this report is based, this or any investigation might have resulted largely in conjectures as to the correlations rather than the comparative certainty which in most cases has now been obtained.

Knowledge of the stratigraphy along the river is also necessary to a clear understanding of the sequence of the lower half of the Stinking Creek drainage area. The upper half of Stinking Creek, however, owing to the presence of cannel coal, sometimes in considerable thickness, over much of its area, has been systematically prospected where that coal was most promising. The comparative regularity of the dip of strata there was ascertained previous to the time of the investigation upon which this report is based.

The initial field work in this report was done during the summer of 1916 by Mr. James M. Hodge,

whose coal correlations are those given. The original manuscript was for certain reasons withheld from the press until April, 1919, at which time it was considered advisable to expand the work, and recast the manuscript to some extent, with the idea of presenting a broader and more up-to-date statement. Following out this plan, the writer went into the field early in May in 1919, and spent two weeks reviewing the geology and the coals of the area discussed. Particular attention was paid to the structural geology of Stinking Creek and the adjoining area. The results of these observations have been presented in a separate chapter. Their importance to the oil and gas as well as the coal development of the Stinking Creek area has been noted.

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State Geologist of Kentucky.

Old Capitol, Frankfort, Ky., Sept. 1, 1919.

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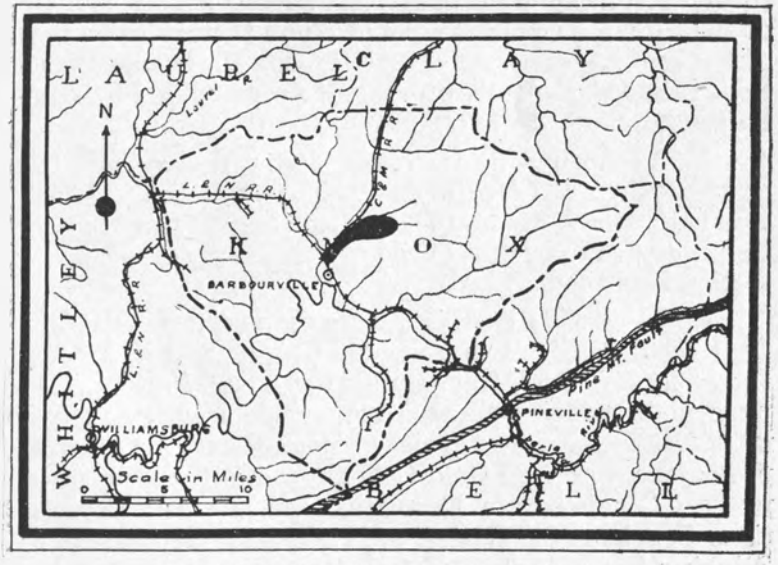
MAPS

Sketch Map of the Stinking Creek Region

INTRODUCTION.

Location.

The Stinking Creek Region of Knox County, Kentucky, upon which this report is based, lies in the southeastern part of the State, between 30° 45′ and 37° north latitude, and 83° 30′ and 84° west longitude. Geographically the area discussed embraces the southeastern half of Knox county. Besides Stinking Creek the adjoining sections of the Cumberland River and sevtral adjacent creeks and branches have necessarily been included within the limits of this report. Barboursville, the seat of Knox county, and the principal town of this section, is just included within the northern boundary of the discussion. The Stinking Creek Region heads to the southeast, east and northeast against Bell and Clay counties, whose geology and mineral resources have furnished the subject matter of a number of previous reports.



SKETCH MAP OF KNOX COUNTY, KY.

The area is entirely covered by Pennsylvanian rocks, except along the Pine Mountain Fault, where Mississippian strata are exposed. They are indicated by cross hatchuring. The black area northeast of Barbourville is the Little Richland Creek Oil & Gas Field. This is also called the Knox County Oil and Gas Field.

Annotated Bibliography.

Very little has been written and published concerning the geology and mineral resources of the Stinking Creek section of Knox County, Kentucky. The following bibliography is believed to be complete except for perhaps a paper or two which may have been published in some of the coal trade journals, files and indexes of which are not available.

1891.—Pearsons, F. M., and Knight, F. J.—The Cumberland Gap Sheet (Topographic), Ky., Va., and Tenn., U. S. G. S., reprint Mar., 1903. North lat. 36° 30′—37°; and west long. 83° 30′—84°. Scale 1-125,000 contour interval 100 feet. Covers entire Stinking Creek Region but is very sketchy, inaccurate, and quite out of date.

1891.—Procter, John R.—Preliminary Map (Geological) of Kentucky; scale, 1 inch equals 20 miles, pocket cover. Kentucky Geol. Surv. shows the aerial geology of the Stinking Creek Region of Knox County to be that of the coal measures or carboniferous. Diagramatic sections included. Same map reduced. Accompanied by Electic Geographies. Date not given.

1907.—Hoeing, J. B.—Preliminary Geological Map of Kentucky. Ky. Geol. Surv., Series III, Scale, 1 inch equals 10 miles. Shows the aerial geology of the Stinking Creek Region to be that of the coal measures diagramatic sections included.

1912.—Crandall, A. R., and Sullivan, G. M.—The Coal Field Adjacent to Pineville Gap in Bell and Knox Counties, Ky. Geol. Sur. Bull. 14, Serial 17, 130 pp. 15 page plate maps. One area map, scale 1 inch equals 1 mile. Discusses data furnished by Barbourville oil well, p. 123; place of Blue Gem Coal above the Conglomerate, p. 123; Conglomerate Formation, pp. 10, 12; Correlations Conglomerate Series, p. 11; General Geology, p. 5; Stinking Creek Region, p. 120; Stinking Creek Cannels, pp. 124 to 130; Topography, p. 5; Transition beds above Chester Group, p. 11; Transition beds above conglomerate series, p. 10; White Mountain, etc., pp. 8, 87, 88, 89, 102, 103, 120.

1915 and 1917—Sellier , L. M.—Preliminary Map (Geological) of Kentucky. Ky. Geol. Surv., Series IV. Scale, 1 inch equals 10 miles. Shows the Stinking Creek Region of Knox County, Ky., to be mantled by rocks of the Pennsylvanian System. Diagramatic sections accompany 1917 map.

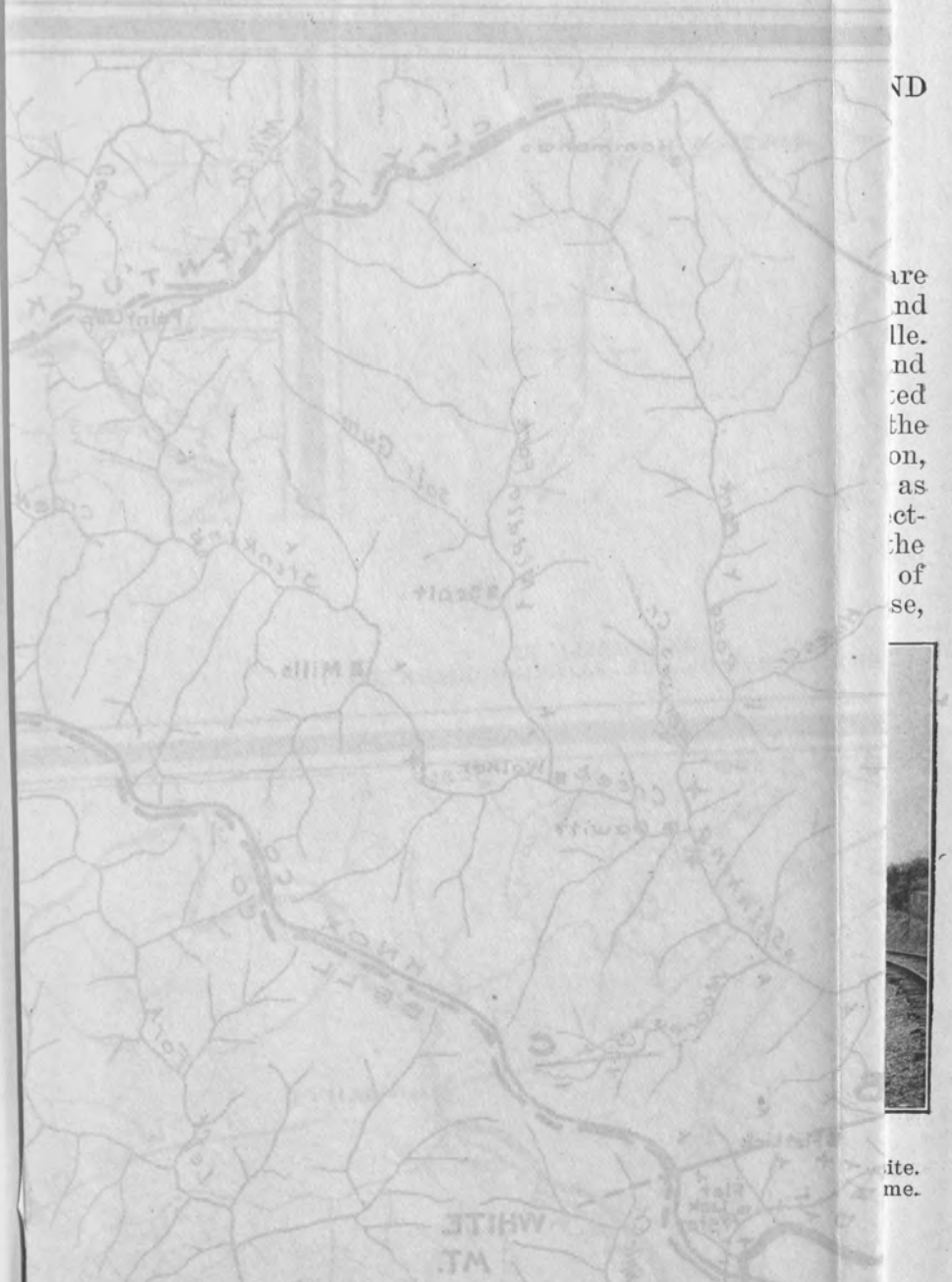
Topography.

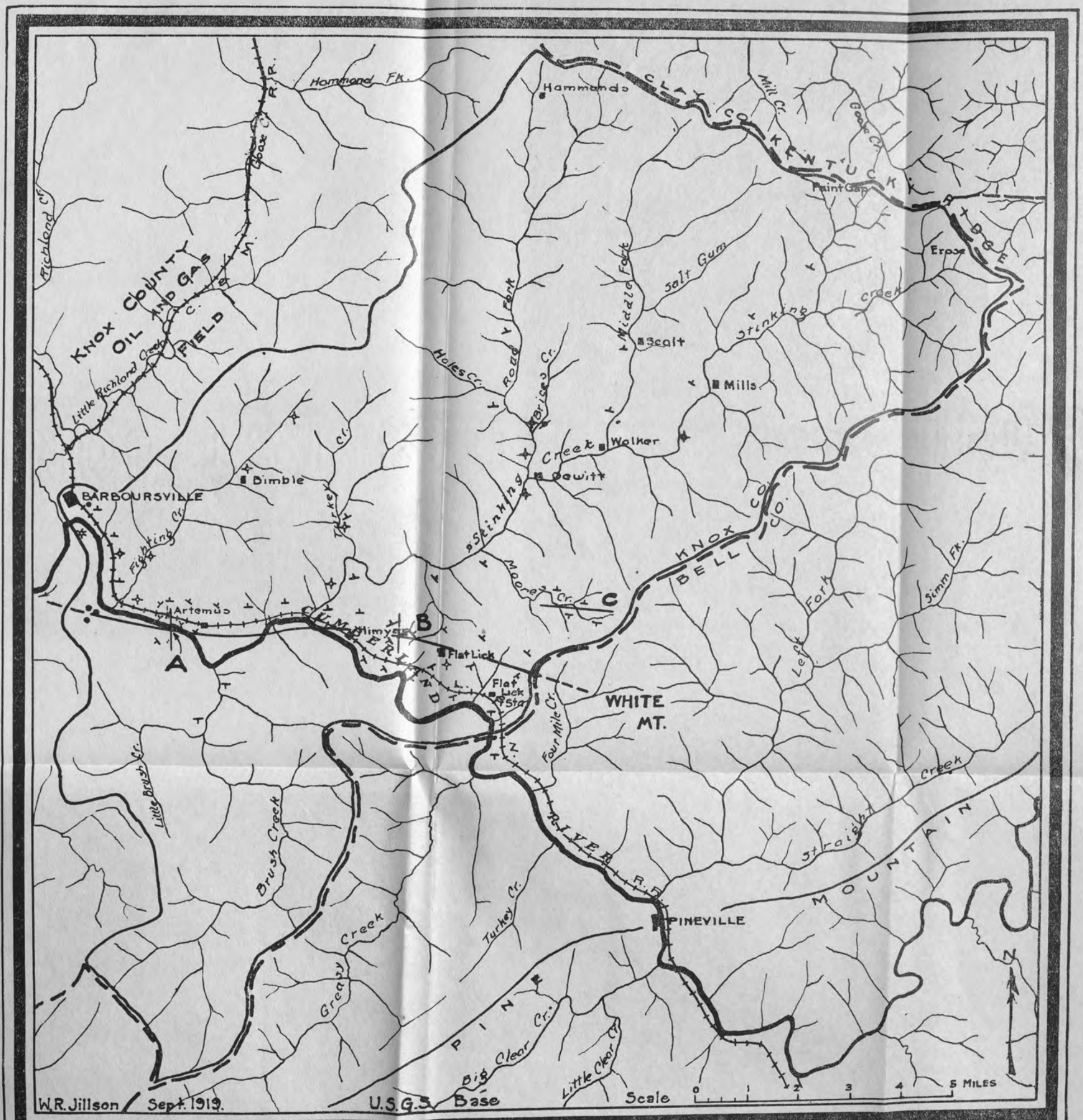
Practically all of that large area lying between the Kentucky Ridge and the Cumberland River is drained by Stinking Creek. The region is one of mature and highly perfect dendritic drainage. A very localized and single exception to this broad statement is found in that restricted area lying between Sandy Branch and Lower Stinking Creek, where there is a small swampy flat imperfectly drained. In the lower part of Stinking Creek some accordance is found between the geologic structure and the topography. The valleys, with the exception of Lower Stinking Creek, where is found a localized plateau, are V-shaped and narrow. The ridges are irregular and very sharp. The minimum elevation is assumed at 960 feet above sea level at low water at the debauchure of Stinking Creek into the Cumberland River. Maximum elevations in the surrounding ridges of from 2,000 to 2,200 feet are found. Differences of elevation of about 1,000 feet are the rule. Stinking Creek is about eighteen miles in length, being subdivided into three principal forks, all of which find their headwaters in the Kentucky Ridge. These forks are: Road or Left Fork, Middle Fork and Right Fork or main Stinking Creek. Besides these there are several smaller tributary creeks and branches, the most important of which are Trace, Elliot, Lost Fork, Rolling Fork, Moore's and Turkey Creeks.

Culture.

Comprising an area of approximately thirty square miles, the Stinking Creek Region is characteristically one of those sections of the "mountains" of Kentucky that has enjoyed even to the present a relative isolation. Primitive living and developmental con-

ditions which are found at every turn are, of course, due to a lack of modernization. The Louisville & Nashville Railroad, following the Cumberland River, serves the district generally, but no spur or branch line has yet been constructed up the main creek to give outlet to the produce or coals of the section. With the exception of Barbourville, which is nine miles distant from the mouth of Stinking Creek, Artemus, Flat Lick and Himyar, with a total population of perhaps 2,000 people, are the only important communities. Mountain farming, timbering and sporadic coal mining are the chief and only general vocations. Though still largely covered by forest, Stinking Creek has exported the most and best of its timber. For this reason the lumbering business must necessarily continue to be of decreasing importance.





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SKETCH MAP OF THE STINKING CREEK REGION,
KNOX COUNTY, KY.

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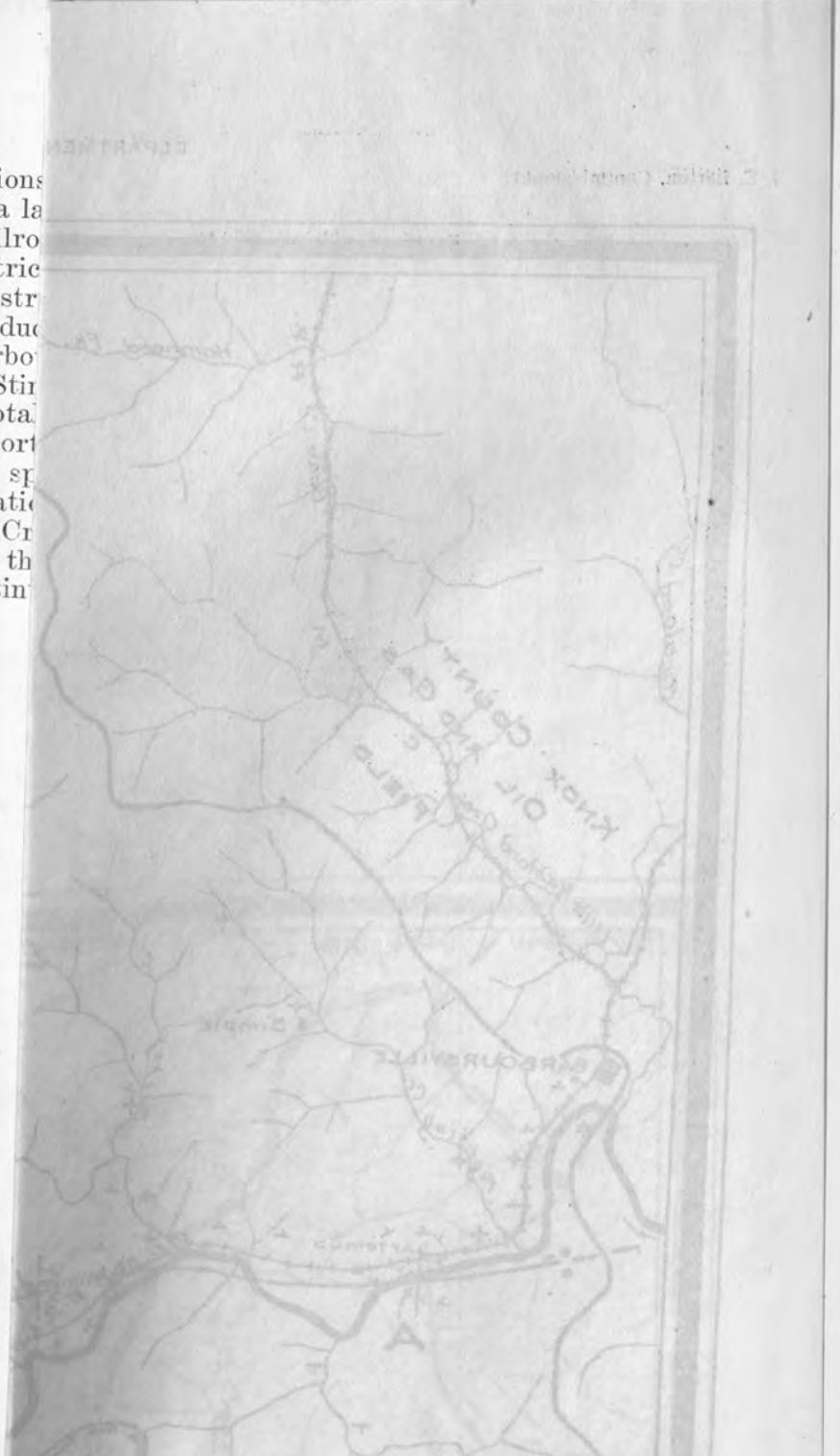
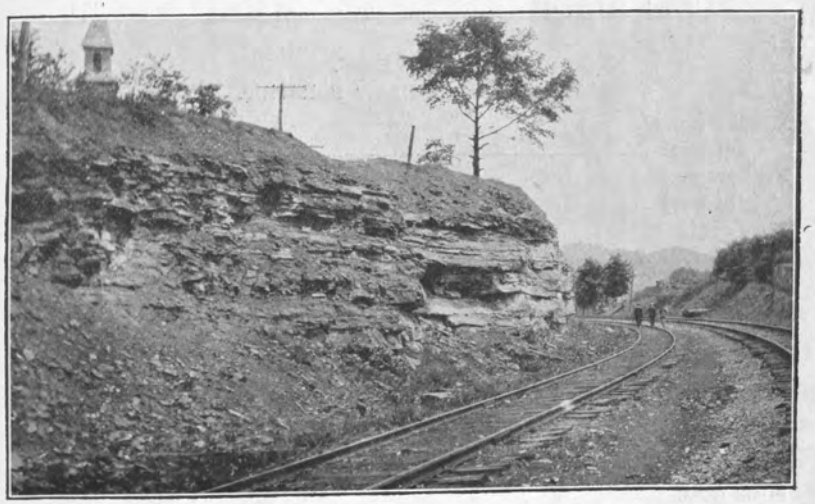


CHAPTER I.

STRATIGRAPHY, STRUCTURE, AND OIL AND GAS RESOURCES OF THE STINKING CREEK REGION.

Stratigraphy.

The rocks exposed in the Stinking Creek Region are principally those alternating sandstones, shales and coals, which have been referred to the Upper Pottsville. These correlate with the Wise series of Virginia, and Kanawha series of West Virginia. A very restricted ridge area, which shows the Helton Coal, belongs in the Alleghany. There is probably no area within this region, in which the Middle Pottsville, Norton, or New River, as it is designated in Virginia and West Virginia, respectively, outcrops. The strata above drainage in the region under discussion includes some fifty odd feet of the Flat Lick Sandstone under the Lily Coal at the base,



POTTSVILLE SANDSTONE NEAR ARTEMUS.
View is in Louisville & Nashville cut just south of the townsite. The beds are seen rising towards the reader, on to the Artemus dome. Photo by W. R. Jillson, May 17th, 1919.

to perhaps 200 feet above the Helton coal at the top, a total thickness of about 1,800 feet. Exceptions to this broad statement may be found on the dome at Flat Lick and on Moore's Creek, where the very sharp folding has brought to very restricted outcrop lower strata unexposed at any other point within the area. The thickness and the character of that portion of the Pottsville, which lies below the Flat Lick Sandstone and the Lily coal, together with still older formations, are shown by a selected group records of wells drilled in this and adjoining sections for oil.

The stratigraphic sequence of the important coals with their approximate intervals is as follows:

STRATIGRAPHIC SEQUENCE OF COALS IN THE STINKING CREEK REGION.

ALLEGHANY.

Ridge Interval	200	
Helton coal.		
Interval	150	
Total Interval		350

POTTSVILLE.

Wise-Kanawha-Upper Pottsville.

Hindman coal.		
Interval	50	
Francis coal.		
Interval	100	
Flag coal.		
Interval	80	
Hazard coal.		
Interval	60	
Haddix coal.		
Interval	170	
McGuire (Fire Clay Rider) coal.		
Interval	50	
Dean (Fire Clay coal).		
Interval	130	
Mills coal.		
Interval	170	
Howard coal.		
Interval	200	
Moss coal.		
Interval	80	
Straight Creek (Jellico?) coal.		
Interval	60	
Blue Gem coal.		
Interval	50	
Bacon Creek coal.		
Interval	130	
Lily coal.		
Interval (Flat Lick Sandstone)	75	
Total Interval		1505
Total interval above drainage, coals excepted..		1855

Norton-New River-Middle Pottsville.

(Coals and Stratigraphic Intervals Not Exposed.)

TABLE OF THE KNOWN STRATIGRAPHIC SEQUENCE IN STINKING CREEK REGION.

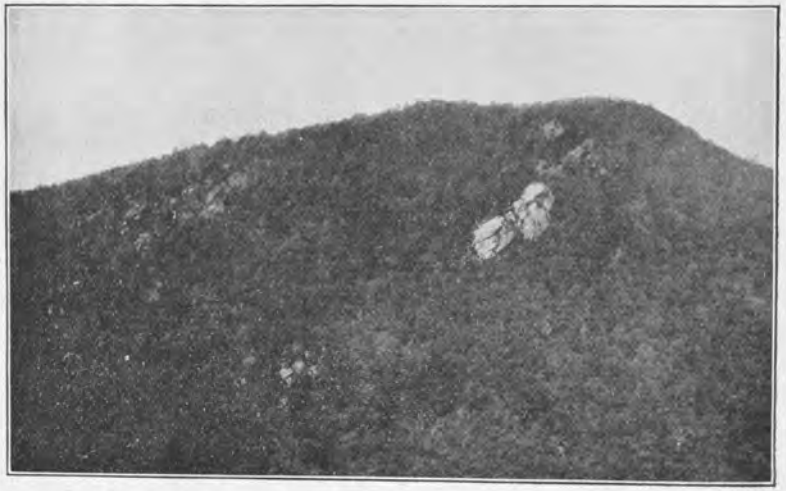
PALEOZOIC ERA.

(Strata above drainage.)

Strata	Minimum Thickness In Feet	Maximum Thickness In Feet
PENNSYLVANIAN SYSTEM.		
Alleghany (Ridge remnants, coals, shales, sandstones)	350	400
Upper Pottsville (Commercial coal, shales, sandstones)	1400	1600
(Strata below drainage.)		
Middle and Lower Pottsville (coal measures and conglomerates)	900	1100
MISSISSIPPIAN SYSTEM.		
Chester or Mauch Chunk (shales, sands, bastard limes)	60	275
St. Genevieve-St. Louis (compact limestones)	140	225
Big Injun-Waverly (shale, sands, limes)..	250	350
DEVONIAN SYSTEM.		
Black shale (shales vari-colored)	100	125
SILURIAN SYSTEM.		
Niagara-Clinton (shales and limes)	175	250
(Lower strata unknown.)		

Structure.

A broad conception of the structural location of the Stinking Creek Region, in Knox County, Southeastern Kentucky, places it slightly to the southeast of the Eastern Kentucky Geosyncline. Lying in such a position it is bounded on the northwest by the lowest structure in the eastern part of the State, and on the southeast by the Pine Mountain Fault and Fold. The



TILTED BASAL POTTSVILLE (LEE) CONGLOMERATE.
At Crest of Pine Mountain.

The view is to the southwest from an altitude of 1,800 feet across the Cumberland River Gap, just above Pineville, Kentucky. The eroded Pine Mountain fault scarp begins at the mountain crest and continues to the right out of the picture—that is to the northwest. The heavy timber in the lower right hand portion of the picture obscures the exposed Mississippian limestones and shales. Photo by W. R. Jillson, May 16, 1919.

rocks of this area, as a whole, are but slightly disturbed, the strata for the most part north of the Cumberland River dipping gradually to the northeast on the eastern branches of Stinking Creek, and to the northwest on the western branches of the same stream. South of the Cumberland River the dip is to the south and southeast.

As one progresses up the Cumberland River from Barbourville to Artemus, strong north dips are found

just west of Artemus. In the railroad cut and along the road at this point northwest, north and northeast dips are found. Progressing further to the east, north dips are encountered in the creek valley above the mouth of

NEAR CREST OF ARTEMUS DOME.

View is on the Barbourville to Artemus road where the road rises up on to the bald bluff near Louisville & Nashville Railroad cut. The sandstones are dipping nearly due north. Photo by W. R. Jillson, May 18th, 1919.

Stinking Creek. These dips change as one goes to the east, until a point is reached on the road between Himyar and Flat Lick, where northwest, north and northeast dips are again encountered. Along the Louisville & Nashville Railroad from Himyar to Flat Lick Station, the general dip is to the south, but at a point about one mile east of Himyar, in the railroad cut, a pronounced fold is seen, giving dips to the southeast and the southwest. South of the Flat Lick Station the dips encountered are to the southeast.

On Brush Creek, south of the Cumberland River, the general dips are to the south and the southeast. On Stinking Creek, one mile above the mouth, the dip, as seen in the small dissected plateau, is to the north. On Turkey Creek, a lower tributary of Stinking Creek, the general dip is to the northwest. Advancing up Stink-

ing Creek, northeast dips are encountered up to Moore's Creek, and no evidence of a fold is seen. On Moore's Creek, itself, at the forks, a pronounced fold is seen, with dips at high angles to the north and to the south. On the Right Fork of Stinking Creek, northeast dips are measurable on exposed strata well into the headwaters. On the Middle Fork of Stinking Creek the dips are principally to the north, for a distance of about three miles. after which a very slight reverse becomes apparent. On the Right Fork of Stinking Creek the dips are visibly northwest.

In summation then, the Stinking Creek section of Knox County is bisected from a point about two miles south of Barbourville through Artemus, Himyar and Flat Lick by a pronounced anticlinal fold. Two features

SOUTHWEST FLANK OF FLAT LICK DOME.
Thin bedded, red faced sandstones dipping at an angle of 20 degrees, 200 yards from the crest on the road from Himyar to Salt Lick. Photo by W. R. Jillson, May 16, 1919.

of outstanding importance distinguish this, the Artemus-Flat Lick Anticline. The first of these features is a pronounced doming, which occurs in the bed of the Cumberland River about one-half mile west of Artemus. Dips to the northwest, north and northeast are obtainable in exposed strata on the high bluff above the river, in the

railroad cut, and in the road at this point. Slight indications of southwest dips are also obtainable, but the structure to the southeast, south and southwest is not definitely determined, due to insufficient rock exposure. The doming near Artemus has been indicated by the letter "A," on the large sketch map accompanying this report.

One mile east of Himyar on the Himyar-Flat Lick Road, occurs the second pronounced structural feature of the Artemus-Flat Lick Anticline. This again is a doming, which is probably slightly faulted. Due to the soft character of the lower sandstone brought to the surface by the erosional truncation of this fold, faulting at this point cannot be definitely determined. This second pinnacle, the Flat Lick Dome, is more pronounced than the one at Artemus. Two to three miles east of the pinnacle point near Himyar, the rock strata on either side of the axis of the Artemus-Flat Lick Anticline, dip off to the northeast and the southeast at rather low angles, the fold passing into Bell County on the head of Four Mile Creek. The high point of the Flat Lick Dome is indicated on the map by the letter "B."

On Moore's Creek there is an area of disturbance which is quite as great, if not greater, than that of either dome on the Artemus-Flat Lick Anticline. This area of disturbance is found near the forks of Moore's Creek. The structure is a pronounced anticline, with east and west major axis. When first seen below the forks it is a highly arched anticline, but no evidence of faulting is observable due to an overlap of soil and vegetation. Farther up the creek above Gregory's Branch very pronounced folding is seen and evidences of faulting are apparent. Below the forks on Moore's Creek, on the farm of J. T. Spurlock, dips of 23° are exhibited to the north and dips of 18° to the south. In Gregory's Branch farther up the stream on the Robert Gregory farm, thirty feet above the creek an entry into an old domestic coal opening shows the strata to be dipping north at an angle of 6°. Bedded sandstones exposed at the mouth of Gregory Branch dip at an angle of 13° north, 30° east. The high crest of this Moore's Creek Anticline and the fault plane are found one-eighth of a mile above Gregory Branch. The house of Noah Miller is located on the crest of this structure.

One hundred yards above the house the reverse is seen, where sandstones are found dipping at an angle of 25° south, 30° west. Just below Miller's house sandstones in the road dip at an angle of 40°. The eastward extension of this anticlinal structure, which is designated on the large sketch map by the letter "C," is found on the headwaters of the Left Fork of Straight Creek, in Bell County.

There is probably a close relationship between the folding and faulting on the head of Moore's Creek and

NEARLY VERTICAL BEDS—PINE MOUNTAIN FAULT.
View in Louisville & Nashville Railroad cut just southeast of the mouth of Straight Creek. Photo by W. R. Jillson, May 16, 1919.

the folding and possible faulting along the Cumberland River between Artemus and Flat Lick. South of Moore's Creek the Artemus-Flat Lick fold is very flat. This structural condition is probably the resultant of the development of the pronounced fold and fault slightly to the north on Moore's Creek. It is extremely probable that had the pronounced folding not developed on Moore's Creek, the eastward extension of the Artemus-Flat Lick structure would have been more accentuated. Both the Artemus-Flat Lick Anticline and the Moore's Creek Anticline are undoubtedly closely related in genesis to the great Pine Mountain Fault and Fold to the southeast. The axes of these two minor structures lie at an angle with the major axis of the Pine Mountain structure and may be considered as radiating expressions of the great crustal disturbance, which brought about the Pine Mountain Fold and Fault.

Drainage Modifications.

From a physiographic standpoint, the area about the Flat Lick Dome of the Artemus-Flat Lick Anticline presents several considerations of interest. A study of the topography of the Flat Lick and Lower Stinking Creek sections reveals the remarkable fact that in this locality there is not only a large area of imperfect drainage, but also a recession to the north on the waters of Stinking Creek of the major elevations of this region. Between Flat Lick Station and Flat Lick the drainage is to the southeast and south, at a very low angle. Further north of the Flat Lick townsite the drainage divide to the waters of Stinking Creek is almost imperceptible, the waters of Stinking Creek being reached by the very lowest gradient. This fact, so out of the ordinary in a locality where perfect mature dendritic drainage is the rule, suggests greatly changed conditions of drainage during some comparatively recent time.

Typical, though restricted plateau topography has been developed along the lower waters of Stinking Creek, which stream from the mouth of Turkey Creek flows through a gorge to join the Cumberland River. The plateau-forming strata is a strong sandstone, which un-

derlies the Lily coal. This sandstone is here designated as the Flat Lick Sandstone, since it is well exposed by the doming at Flat Lick. The best expression of this unique Stinking Creek plateau is seen from below the mouth of Turkey Creek, south to the Cumberland River, where the plateau rises to the crest of the Artemus-Flat Lick Anticline.

Southeast of Flat Lick, on the south side of the Cumberland River, elevations of 1,500 feet are found within a half to three-quarters of a mile from the Cumberland River. On the north and opposite side of the river elevations of 1,500 feet are only found at points three or four miles to the northeast, north and northwest

TOPOGRAPHIC SKETCH MAP OF LOWER STINKING CREEK.
The recession of the higher elevations to the north and northeast near the mouth of Stinking Creek is well shown. The position of the abandoned meander of the Cumberland River is indicated by broken lines.

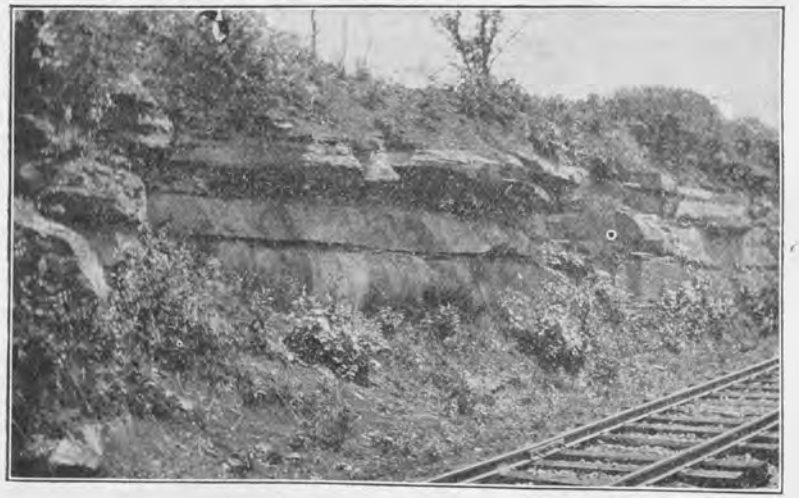
of the river. At the mouth of any large stream like Stinking Creek one would naturally expect a recession of higher elevations toward the headwaters of the main tributary stream. In comparison, however, with the other large streams of this and adjoining areas, the recession of the higher elevations in and about the lower waters of Stinking Creek is too great. This fact coupled with the observable imperfect drainage at Flat Lick, and the presence of the only recently entrenched bed of lower Stinking Creek in the Flat Lick Sandstone, indicate that this Flat Lick-Lower Stinking Creek Region is an abandoned meander of the Cumberland River.

Reasonable explanation for this abandonment of the channel is seen in the high doming of the Artemus-Flat Lick Anticline between Himyar and Flat Lick. It is probable that prior to this important disturbance the Cumberand River flowed in a course, which had its bed somewhat as is indicated on the accompanying small sketch map of this section. At the time of the pronounced folding the Cumberland River meandering across this area was trapped to the southeast of this structure and due to the presence and strength of the Flat Lick Sandstone, was unable, once the folding was fairly instituted, ever to regain its old channel northward across the Flat Lick Townsite.

Oil and Gas Resources

The Stinking Creek region has been somewhat sporadically and very unsuccessfully prospected for oil and gas. Old wells have been drilled at many points on the lower waters of Stinking Creek and the adjacent streams. In 1918 a well was drilled on the Artemus-Flat Lick Anticline, just south of Flat Lick. The Stinking Creek region does not include any of the so-called Knox County Oil and Gas Field, which lies principally north and northeast of Barbourville, on Little Richland Creek. However, the well distributed drilling which has been done within the Stinking Creek region may be interpreted as a wild cat attempt to extend the Little Richland Creek Field to the southeast.

All of the wells which could be ascertained or located within the Stinking Creek region have been plotted on the large sketch map accompanying this report. There is a productive gas well south of Barbourville, in the bend of the Cumberland River. The amount of gas secured in this well is small, probably not over 50,000 cubic feet. A well drilled just east of Barbourville by the Knox Gem Coal Company, in 1901, produced oil at 565 feet from the Knox Sand, which at this point is 25 feet thick. Unfortunately this well was never put on the pump. Two miles south of Barbourville adjoining the Cumberland River, three wells were drilled into production in the Knox Sand by L. W. Hampton. These wells were about 565 feet deep and are located on the westward extension of the Artemus-Flat Lick Anticline. Near the mouth of Fighting Creek a dry shallow well was drilled in 1918. Near the mouth of Brice's Creek, on the Road Fork of Stinking Creek, a well was drilled a few years ago on the J. G. Baker farm, which produced at a depth of 1,500 feet a little gas and about one barrel of oil. This is the



CREST OF ARTEMUS DOME.

View is along the Louisville & Nashville Railroad track in the cut which crosses the top of this structure. The sandstones are dipping to the northeast at an angle of 7 degrees. Photo by W. R. Jillson, May 18th, 1919.

only well in this section which has been drilled below the Big Lime.

In the Little Richland region, just west of the Stinking Creek region, generally three and sometimes four true silicious oil stands are found. These are the Wages, Jones, Knox and Epperson. The Knox Sand is somewhat variable and may or may not occur in the sequence. The Wages Sand is generally about 40 feet thick and is found at a depth of about 200 feet below the Blue Gem Coal. The Jones Sand is about 75 feet thick and is found about 400 feet below the Blue Gem Coal. The Knox Sand, when it is encountered, is about 25 feet thick and is found about 600 feet below the Blue Gem Coal. The Epperson Sand is about 60 feet thick and is found about 700 feet below the Blue Gem Coal. All of these sands produce in the Little Richland Creek section both oil and gas, though the Wages and the Jones have been the most prolific producers.

Drillings in the Stinking Creek section show all four of these Pottsville Sands to be present. As in the Little Richland Section, however, the Knox Sand is only occasionally encountered. The considerable amount of unproductive drilling in the Stinking Creek section raises the question as to the cause of the apparent barrenness of this area. It is the writer's belief that the cause of this unproductivity may be generally ascribed to two factors, both of them structural. Examinations of the Artemus-Flat Lick Anticline adjoining the towns of Artemus and Flat Lick, lead to the belief that this structure has been too intensely folded to be productive. The same conclusions are even more easily reached upon an examination of the anticline on Moore's Creek. The second factor of importance, which has undoubtedly contributed largely to unproductive wells, is the synclinal habit of the Pottsville oils of Kentucky. Both in Knox County and in Floyd County, the two largest contributing areas of Pottsville crude oil, the major geologic structure is synclinal. Water conditions are, of course, contributory, and other factors, which have never been satisfactorily explained, probably enter in. However that may be, the fact remains that neither in Knox County nor in Floyd

County is oil production ever encountered in any quantity away from the synclinal areas. Although the complete structure of Knox County has never been mapped, it is now generally known that the Little Richland Creek section is geosynclinal. With rocks in the Stinking Creek section dipping down into it and with the knowledge of the synclinal habit of the Pottsville oil of this section, one should hardly expect large production from this horizon to be secured anywhere within the Stinking Creek region. Isolated structural pockets, in which oil might be encountered, probably do exist within the Stinking Creek region, but their number will be small, and drilling in this section must be regarded as extremely hazardous.

NORTHEAST FLANK OF ARTEMUS DOME.
View is on the road about one-half mile below Artemus on the road to Barbourville. Direction of dip N. 50 degrees E., angle 8 degrees. Photo by W. R. Jillson, May 18, 1919.

For the convenience of those who may be interested in the subsurface stratigraphy of the Stinking Creek section, twenty-five selected well logs are presented herewith. Only four of these wells were drilled below the base of the Pottsville Conglomerate. The records of wells drilled to greater than Pottsville depths are: Log No. 6, the C. P. Kennedy, east of Barbourville; Log No. 9, the William Carnes, Road Fork of Stinking Creek;

Log No. 10, the J. B. Baker, Stinking Creek; and Log No. 25, the Madeline Gray, Gray Station. Though deep wells in the Stinking Creek section are few, they have attested the presence of the deep oil and gas sands of the Mississippian and Silurian Systems, which are productive elsewhere in Kentucky. The Devonian System is represented by the black shale only. Due, however, to the geosynclinal structure of this part of Eastern Kentucky, it is not anticipated that important commercial production will ever be secured from the lower regions in the area covered by this report.

SELECTED LOGS OF WELLS DRILLED IN STINKING CREEK AND ADJOINING SECTIONS.

LOG No. 1.

JONES FARM.
Near Girdler P. O.

Strata	Thickness	Depth	
Soil	17	17	
PENNSYLVANIAN SYSTEM.			
Sand	15	32	
Gray shale	25	57	
Gray sand	33	90	
Black shale	140	230	
Sand	20	250	Wages sand.
Mixed shale	100	350	
Black shale and coal	15	365	
Stray sand (oil)	10	375	Stray sand.
Sand (oil)	15	390	Jones sand.
(All Pottsville).			

LOG No. 2.

JONES "GUSHER"—SI. JONES FARM.
Little Richland Creek.

Strata	Thickness	Depth	
Clay	8	8	
PENNSYLVANIAN SYSTEM.			
Slate	30	38	
Sand (black oil show)	70	108	
Slate	100	208	
Sand	20	228	Wages sand.
Slate	70	298	
Sand	8	306	Stray sand.
Slate	44	350	
Sand (oil)	30	380	Jones sand.
(All Pottsville).			

LOG No. 3. JOSEPH A. MILLER FARM.
Little Richland Creek.

Strata	Thickness	Depth	
Soil	15	15	
PENNSYLVANIAN SYSTEM.			
Sand	25	40	
White slate	20	60	
Brown shale	20	80	
Slate	60	140	
Sand (show of oil)	20	160	Wages sand.
Slate	85	245	
Sand	15	260	Stray sand.
Slate	30	290	
Black slate (salt water and gas)	5	295	
Sand	68	363	Jones sand.

(All Pottsville).

LOG No. 4.

JOHN WAGES FARM.
Little Richland Creek.

Strata	Thickness	Depth	
Clay	9	9	
PENNSYLVANIAN SYSTEM.			
Shale	30	39	
Sand (black oil)	15	54	Wages sand No. 1.
Slate	50	104	
Sand	20	124	
Slate	20	144	
Sand (oil)	18	162	Wages sand No. 2.

(All Pottsville).

LOG No. 5.

WELL AT BARBOURVILLE.

Strata	Thickness	Depth	
PENNSYLVANIAN SYSTEM.			
Dark shale	90	90	
Fine, gray sand	20	110	Wages sand.
Dark, gray sand	90	200	Wages sand.
Gray sand	15	215	Wages sand.
Dark shale	25	240	
Sand and black shale	25	265	
Gray sand	10	275	Jones sand
Fine, gray sand	65	340	Jones sand
Black shale and sand	78	418	
Fine gray sand	42	460	
Dark shale and sand	75	535	

Fine gray sand	5	540	Epperson sand.
Fine brown sand	10	550	Epperson sand.
Brownish sand	5	555	Epperson sand.
Brown sand (salt water)	25	580	Epperson sand.

(All Pottsville).

LOG No. 6.

C. P. KENNEDY FARM.
East of Barbourville.

Strata	Thickness	Depth	
Loam	38	38	
PENNSYLVANIAN SYSTEM.			
Black sand	22	60	
Coal	3	63	
Black slate	7	70	
Gray sand	15	85	
Black slate	70	155	
Coal	4	159	
Black slate	6	165	
Gray lime (?)	21	186	
Black slate	19	205	
Gray sand—oil show at 210	35	240	
Black slate	68	308	
Gray sand	27	335	
Black slate	15	350	
White sand—oil show at 385	95	445	Coal Measures and Conglomerates.
Black slate	18	463	Coal Measures and Conglomerates.
Gray sand	107	570	Coal Measures and Conglomerates.
Black slate and shells	25	595	Coal Measures and Conglomerates.
White sand	75	670	
Black shale	10	680	
Black slate	40	720	
White sand—salt water at 743	43	763	
Black slate	37	800	
Brown sand	60	860	
Black shale	10	870	
White sand	105	975	
Black slate	47	1022	
White sand	15	1037	
Black slate	23	1060	
White sand	15	1075	

MISSISSIPPIAN SYSTEM.			
Blue lime	15	1090	Chester or Mauch Chunk.
Red rock	18	1108	
White sand	5	1113	
Red rock	32	1145	
Black slate and shells	63	1208	
Red rock	20	1228	
Blue slate	32	1260	
Brown sand—oil show at 1270	26	1286	
Blue slate	24	1310	
Blue lime	15	1325	
Blue slate	65	1390	
Brown lime—gas show at 1395	12	1402	
White slate	10	1412	
White lime— "Big lime"—gas show at 1470	143	1555	St. Louis.
Slate and shells	260	1815	Waverly.
Blue "flint"	15	1830	
Gray sand	55	1885	
White slate and shells	20	1905	
DEVONIAN SYSTEM.			
Black shale	145	2050	
SILURIAN SYSTEM.			
White slate and shells	135	2185	Niagara.
Pink slate	55	2240	
White slate	15	2255	
Red rock	25	2270	Clinton.
Slate and shells	230	2500	

LOG No. 7. E. HAMMOND FARM.
Stinking Creek.

Strata	Thickness	Depth	
Soil	20	20	
PENNSYLVANIAN SYSTEM.			
Slate	92	112	
Lime (?)	5	117	
Sand	11	128	
White sand	22	150	
Slate	140	290	Coal Measures and Conglomerates.
Sand	10	300	
Slate and shale	197	497	

Sand—oil show at 572	75	572	
Slate	153	725	
Sand	48	773	
Black slate	10	783	
Sand—oil show at 826	67	850	

(All Pottsville).

LOG No. 8. ANDERSON FARM—No. 2.
Big Richland Creek near R. R. Crossing.

Strata	Thickness	Depth	
Soil	32	32	
PENNSYLVANIAN SYSTEM.			
Shale and clay	28	60	
Shale	28	88	Coal Measures and Conglomerates.
Sand	12	100	
Shale	50	150	
Sand	43	193	
Shale	14	207	
Sand	15	222	
Slate	26	248	
Sand—oil show	8	256	

(All Pottsville).

LOG No. 9. WM. CARNES FARM.
Road Fork of Stinking Creek.

Strata	Thickness	Depth	
PENNSYLVANIAN SYSTEM.			
Sand	29	29	Coal Measures and Conglomerates.
Slate	21	50	
Lime and sand	50	100	
Coal	2	102	
Slate and lime	48	150	
Sand	25	175	
Slate and lime	50	200	
Coal	6	206	
Slate and sand	69	275	
Slate	25	300	
Sand—gas show at 307	50	350	
Slate and lime	50	400	
Black slate	55	455	
Broken slate	20	475	
Whte sand	115	590	
Slate and sand	40	630	
Sand (base of Pottsville)	390	1020	

MISSISSIPPIAN SYSTEM.			
Black lime	20	1040	Chester or Mauch Chunk.
Sand	10	1050	
Black lime	25	1075	
Limestone	225	1300	St. Louis.
Slate and shells	60	1360	Waverly.
Sand and lime	10	1370	
Red rock	15	1385	
Lime and shells	35	1420	
Sand	5	1425	
Red rock	50	1475	
Shells	35	1510	
Slate and sand	50	1560	
Sand	35	1595	
DEVONIAN SYSTEM.			
Black shale	15	1610	

LOG No. 10.

J. G. BAKER FARM.
Stinking Creek.

Strata	Thickness	Depth	
Soil	12	12	Coal Measures and Conglomerates.
PENNSYLVANIAN SYSTEM.			
Coal	4	16	
Sandstone, hard	150	166	
Slate	200	366	
White sand	74	440	
Slate	260	700	
Sand (base of Pottsville)	400	1100	
MISSISSIPPIAN SYSTEM.			
Shale	60	1160	Chester or Mauch Chunk.
Lime (Big Lime)	205	1365	St. Louis.
Sand—oil show at 1385	75	1440	Waverly.
Slate	60	1500	
Red rock	40	1540	
Red rock and shale	160	1700	
Black lime	50	1750	
DEVONIAN SYSTEM.			
Slate	47	1797	

LOG No. 11.

DOZIER FARM.
Fighting Creek.

Strata	Thickness	Depth	
Sand	16	16	
PENNSYLVANIAN SYSTEM.			
Shale	25	41	
Coal	3	44	
Black shale	123	167	
Sand, hard	23	190	
Sand	35	225	Wages sand.
Sand, hard	15	240	
Shale	120	360	
Sand	100	450	Jones sand.
Slate	15	475	
Sand	250	725	Epperson sand.
Coal	2	727	
Sand	173	900	Salt sand.

(All Pottsville).

LOG No. 12.

H. P. MARTIN FARM.
Fighting Creek.

Strata	Thickness	Depth	
PENNSYLVANIAN SYSTEM.			
Clay	20	20	
Sand	30	50	
Shale	60	110	
Sand	20	130	
Slate	70	200	Coal Measures and Conglomerates.
Sand	90	290	
Slate	40	330	
Sand—gas	80	410	
Slate	15	425	
Sand—salt water	398	823	

(All Pottsville).

LOG No. 13.

H. P. MARTIN FARM.
Fighting Creek.

Strata	Thickness	Depth	
PENNSYLVANIAN SYSTEM.			
Sand	35	35	
Sandstone, hard	5	40	
Shale	200	240	Coal Measures and Conglomerates.

Sand	15	255	
Shale	50	305	
Sand	40	345	
Shale	60	405	
Sand	100	505	
Shale	40	545	
Sand	132	677	

(All Pottsville).

LOG No. 14.

JOHN J. DISNEY FARM.
Big Richland Creek.

Strata	Thickness	Depth	
Soil	15	15	
PENNSYLVANIAN SYSTEM.			
Slate	35	50	
Sand	5	55	
Slate	45	100	
Shale	140	240	Coal Measures and Conglomerates.
Sand (Wages) — oil show	20	260	
Shale	5	265	
Sand	10	275	
Shale	85	360	
Sand (Jones)—oil, gas and salt water	200	560	

(All Pottsville).

LOG No. 15.

SI JONES—No. 2.
Little Richland Creek.

Strata	Thickness	Depth	
Clay	30	30	
PENNSYLVANIAN SYSTEM.			
Slate	190	220	
Sand	10	230	Coal Measures and Conglomerates.
Slate	150	380	
Sand (Jones)—oil	80	460	
Slate	40	500	
Sand	120	620	

(All Pottsville).

LOG No. 16.

SI JONES—No. 3.
Little Richland Creek.

Strata	Thickness	Depth	
Soil	22	22	
PENNSYLVANIAN SYSTEM.			
Sand	10	32	
Slate	342	374	
Sand	5	379	Coal Measures and Conglomerates.
Shale	2	381	
Sand (Jones)	12	393	

(All Pottsville).

LOG No. 17.

MOLLIE MANISS FARM.
Fighting Creek.

Strata	Thickness	Depth	
Clay	10	10	
PENNSYLVANIAN SYSTEM.			
Shale	15	25	
Coal	1	26	
Shale	34	60	Coal Measures and Conglomerates.
Sand	30	90	
Slate	13	103	
Coal	7	110	
Shale	80	190	
Sand	55	245	
Shale	4	249	
Sand	106	355	
Shale—oil	35	390	

(All Pottsville).

LOG No. 18.

JAMES GOODIN FARM.
Fighting Creek.

Strata	Thickness	Depth	
Quick sand	15	15	
PENNSYLVANIAN SYSTEM.			
Sandstone, hard	45	60	
Slate	35	95	
Black slate	50	145	
Sandstone, hard	25	170	
White slate	25	195	Coal Measures and Conglomerates.

Black slate	20	215	
Sand	62	277	
White shale	38	315	
Black slate	35	350	
Sand	60	410	
Slate	6	416	
Sand	16	432	
Slate—salt water	6	438	

(All Pottsville).

LOG No. 19.

JAMES GOODIN FARM.
Fighting Creek.

Strata	Thickness	Depth	
Sand	15	15	
PENNSYLVANIAN SYSTEM.			
Slate	8	23	
Sand	19	42	
Slate	30	72	
Sand	18	90	
Dark shale	65	155	Coal Measures and Conglomerates.
Sandstone, hard	15	170	
Brown shale	20	190	
Sandstone, hard	10	200	
Black shale	7	207	
Sand	61	268	
Slate	80	348	
Sand	40	388	
Slate	42	430	
Sand	54	484	

(All Pottsville).

LOG No. 20.

MARY BARTELLOW FARM.
Fighting Creek.

Strata	Thickness	Depth	
Clay	18	18	
PENNSYLVANIAN SYSTEM.			
Shale	180	198	
Sandstone, hard	25	223	Coal Measures and Conglomerates.
Sand	90	313	
Shale	105	418	
Sand (Jones)—oil	30	448	

(All Pottsville).

LOG No. 21.

THOMAS POINDEXTER FARM.
Fighting Creek.

Strata	Thickness	Depth	
Soil and gravel	30	30	
PENNSYLVANIAN SYSTEM.			
Blue shale	20	50	
Coal	3	53	
Shale	7	60	
White sand	40	100	
Black slate	20	120	
Slate and shells	72	192	Coal Measures and Conglomerates.
Gray sand	12	204	
Shale	25	229	
White sand	10	239	
Slate and shells	30	269	
Sand	94	363	
Slate and shells	70	433	
White sand	12	445	
Black slate	10	455	
Coal	4	459	
Shale	16	475	
Sand	39	514	

(All Pottsville).

LOG No. 22.

JAMES BRINDSTAFF FARM.
Fighting Creek.

Strata	Thickness	Depth	
Soil	10	10	
PENNSYLVANIAN SYSTEM.			
Gray sand	45	55	
Blue slate	6	61	
White sand	12	73	
Slate and shells	17	90	Coal Measures and Conglomerates.
Blue shale	20	110	
Slate and shells	82	192	
Black sand	10	202	
Slate and shells	16	218	
White sand—oil show	57	275	
Slate, shale and shells	60	335	
Sand (Jones)—oil at 448 and 471	166	501	

(All Pottsville).

LOG No. 23. JAMES BRINDSTAFF FARM.
Fighting Creek.

Strata	Thickness	Depth	
Soil	10	10	
PENNSYLVANIAN SYSTEM.			
Sand	55	65	
Brown shale	100	165	
White sand	8	173	Coal Measures
Brown shale	22	195	and Conglomerates.
Slate and shells	23	218	
White sand	57	275	
Slate, shale and shells	60	335	
Sand (Jones)—oil at 448 and 471 (All Pottsville).	166	501	

LOG No. 24. JAMES BRINDSTAFF FARM.
Fighting Creek.

Strata	Thickness	Depth	
Clay	10	10	
PENNSYLVANIAN SYSTEM.			
Sand	55	65	
Brown shale	100	165	
White sand	8	173	Coal Measures
Brown shale	22	195	and Conglomerates.
White sand	86	281	
Brown shale	49	330	
White sand	12	342	
White slate	20	362	
White sand	10	372	
Brown shale	20	392	
White sand (Jones) (All Pottsville).	88	480	

LOG No. 25. MADELINE GRAY FARM.
Gray's Station.

Strata	Thickness	Depth	
PENNSYLVANIAN SYSTEM.			
Soil	20	20	
Shale	80	100	
White sand	215	315	
Black shale	30	345	
Sand	150	495	Coal Measures
Shale	8	503	and Conglomerates.
Sand	129	632	
Coal	3	635	
Sand (base of Pottsville)	275	910	

MISSISSIPPIAN SYSTEM.				
Red shale		40	950	Chester or Mauch Chunk.
Black shale		20	970	
Sand		10	980	
Red shale		25	1005	
Black shale		24	1029	
Red shale		41	1070	
Lime		10	1080	
Black shale		28	1108	
Gray lime—"Little lime"		70	1178	
Soft shale		5	1183	
White lime	"Big Lime"	90	1273	St. Louis.
Black lime		4	1277	
Gray lime		24	1301	
Blue lime		20	1321	
Gray lime		15	1336	
White lime		14	1350	
Gray lime		19	1369	
Sand—"Big Injun"		27	1396	Big Injun.
Black shale		24	1420	Waverly.
White shale		5	1425	
Dark shale		15	1440	
Dark sand		5	1445	
Dark shale		10	1455	
Sand and shale		85	1540	
Sand and shale		32	1572	
Light sand		15	1587	
Light shale		13	1600	
Sand and shale		15	1615	
Lime and shale		50	1665	
DEVONIAN SYSTEM.				
Black shale		120	1785	Devonian.
White shale		5	1790	
SILURIAN SYSTEM.				
Sand		5	1795	Niagara and Clinton.
Light shale		25	1820	
Lime		2	1822	
Light shale		30	1852	
Shale and sand		48	1900	
Light shale		30	1930	
Lime		5	1935	
Light shale		20	1955	
Sand		7	1962	
Sand and shale		12	1974	

Note: This well is removed about twenty miles to the northwest of Stinking Creek but is given since it is one of the few accurate records of deep wells in Knox County.

CHAPTER II.

GEOGRAPHIC AND OPERATIVE DATA ON STINKING CREEK COALS.

In the opening of the coals of any new district general information relative to the various seams is always of much importance. Locational and prospecting data often serve the purposes of the investigating operator. The geographic delimitations of the separate coals are always of primal interest to the investor, and to this may be added a long list of other forms of data. Unfortunately in all new districts such desirable information is rare and is never secured except with much difficulty and expense. In the Stinking Creek area all the information that could be obtained has been collected, and is here presented in proper sequence under the headings of the various coals.

Helton Coal.—This coal has been opened in only one place near this region. The opening referred to is toward the head of Straight Creek, and hardly 100 feet below the top of the Kentucky Ridge. The partly closed prospect indicated a good thickness but its height renders it valueless. The bed recently received its name from an opening on the Middle Fork of the Kentucky River.

Hindman, Francis and Flag Coals.—These coals have not been opened in this region.

Hazard Coal.—The Hazard Coal has been opened in one place only, near the head of Straight Creek. Partly covered at this point it can hardly be classed as workable, but the importance of the bed on Kentucky River waters and the large area of it in Kentucky ridge, should lead to intelligent prospecting for it in that vicinity.

Haddix Coal.—This coal has here, as generally elsewhere, a greatly varying bed section with some promise of good workable pockets. It is opened only in the ridge next east of Middle Fork with some thick coal and some cannel, which though generally excellent in quality, adds but little to the value of the bed. The area is small excepting near the head of Middle Fork, where no cannel coal has been found. Eastward, about the head of Straight Creek, a large area of the bed is available.

McGuire Coal.—This coal seam commonly known as the Fire-Clay Rider on Kentucky River waters has become especially well known on Road and Middle Forks of Stinking Creek because of the cannel coal it contains. The few openings in this bed from near the head of Turkey Creek to the head of Hales Creek of Road Fork show coal of workable thickness, much injured by partings but with a good mining area. On the head of Bell Fork (or Mill Creek) and across Road Fork from the mouth of Bell Fork, the bed is thin. On Brice's Creek and toward the head of Ford Fork it is found as cannel coal three and four feet thick, but thorough prospecting appears to have proven the workable coal to be limited to a few very small pockets. An analysis of the cannel coal of this seam is given in this report.

On Middle Fork, on the left of Stinking Creek, towards its head and on the head of Moore's Creek, the bed was found generally carrying cannel coal, but nowhere with a section suitable for mining, its thick coal being seriously injured by partings.

ANALYSIS McGUIRE CANNEL COAL.

G. 3850. Coal labeled "Specimen No. 2 'McGuire' Cannel Coal, farm of William Mills on head of Road Fork of Stinking Creek, Knox Co., Ky. Collected by W. R. Jillson. Seam 4 ft. thick. Sample air-dry."

Sample about a pound lump of cannel coal, showing some pyrite. Received June 28, 1919, from W. R. Jillson, State Geologist.

Analysis	Air-dry Per cent.	Moisture-free Per cent.
Moisture	1.06	
Volatile Combustible Matter	43.09	43.55
Fixed Carbon	47.79	48.30
Yellowish Slate Gray Ash	8.06	8.15
Total	100.00	100.00
Sulfur	1.31	1.32
B. T. U. per pound of coal	14,230	14,380

Specific gravity 1.279.
Analysis by W. D. Iler.
July 14, 1919.

Alford M. Peter, Chief Chemist.

Dean or Fire Clay Coal.—(No. 4 of North Fork of Kentucky River.) This is the most important bed above the Straight Creek Coal in this region, but does not compare favorably here with the same bed in those localities where it has been extensively mined. Except in two openings on Turkey Creek, where coal is thin, and probably one of thin coal on Moore's Creek, the place of the bed is above the hilltops. Near the head of Hale's Creek the bed has thirty inches of clean coal and probably thirty-four inches on Hinkle Branch, but other openings with less coal and a parting make these appear exceptional. Near the head of Anderson Fork of Bell Fork the bed probably has thirty-eight inches of clean coal, across the ridge on the Wolf Pen Branch forty inches, and on Spruce Pine Branch thirty-seven inches. These indicate a good field of excellent coal which is near the base of the hills at the upper openings.

On Mill Branch, above Road Fork, the bed has thirty-eight inches of coal but has an eight inch parting and is high in the hill.

The prospecting on Middle Fork of Stinking Creek probably opened the Dean coal in numerous places, but nothing was learned of such openings during the recent examination, and it is presumed only thin coal was found. It is not likely that the bed has been especially searched for on the left of Stinking Creek above Middle Fork, where no openings are now known.

On the right of Stinking Creek, from Lost Fork to the head of Jones Fork, the four openings seen on the Dean coal show 2 to 4½ feet of coal at moderate height but with partings that render it nowhere attractive. Its excellent showing on the head of Goose Creek and Left Fork of Straight Creek promises well for the bed under the dividing ridge.

Mills Coal.—The Mills coal seems to be the next coal below the Dean coal and may be the Whitesburg coal of the Kentucky River section, but if so, it here has an interval from the Dean double that heretofore known. There is no indication here of the ten to twenty foot partings so conspicuous in that bed on Red Bird Creek, at Hazard and elsewhere. Because of these differences a new name, the Mills Coal, is given to this bed here. Nine openings on the bed have been identified, all of them above the mouth of Road Fork, but only one of them, at the mouth of Lost Fork, approaches workable thickness. That one is reported to have thirty-eight inches of clean coal in a three foot bed.

Howard Coal.—This coal lies about half way between the Dean and Straight Creek coals, and as on Goose Creek, is generally in widely separated parts. On the head of Mud Lick Branch of Stinking Creek the bed has four feet of coal with three partings and is high in the hill but still in workable condition. Of numerous openings into this bed on Road and Middle Forks and above the latter, none shows so much as two feet of coal. On Middle Fork the two splits of the bed are opened, one forty-five feet directly above the other.

Moss Coal.—Along the river this coal is opened only near Artemus, where two small mines were formerly operated in about three and one-half feet of coal near the top of the hill. The splitting of the bed within the mines probably caused their abandonment, but one of them was again in operation in 1917, on a small scale due to the high price of coal then in force. On Turkey Creek this bed has thirty inches of coal and on Stinking Creek, below Lick Branch, the two splits, nine feet apart, show about 18

inches each. On Moore's Creek, if correlations are correct, the coal is opened to a maximum of thirty-four inches near creek level, and also, across the anticline and high on the hill, to forty-six inches with only two inches of parting. On Mill and Meadow Branches, above Road Forks, entries show the coal twenty-seven and thirty-two inches thick, but the four openings farther up the creek are much less favorable. An entry on Rolling Fork, probably in this bed, is said to have a parting of about eighteen inches.

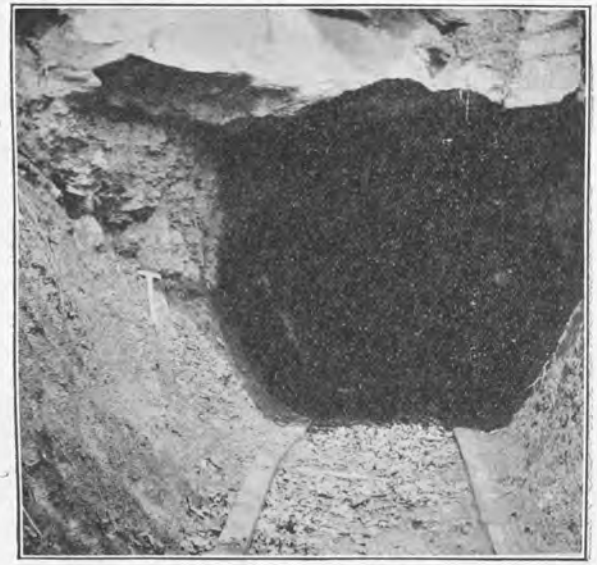
The bed appears in this region to be generally in two splits sometimes as far apart as forty-five feet and again virtually in contact.

Straight Creek Coal.—This bed is twenty-one and twenty-six inches thick in entries above Fighting Creek. Above one of these entries is a fifteen foot, smooth sandstone cliff. This sandstone is exposed in cliffs elsewhere in the region, but becomes less prominent away from the river, though generally showing in some degree directly upon the coal at openings made. The few other openings into this bed near the river indicate no thicker coal than these entries, but on Turkey Creek, near its mouth, the bed shows four feet of coal with two thick partings. The coal becomes thinner in all directions from this point. The Woodson and Stewart mines, by the road to Artemus above the mouth of Turkey Creek, have clean coal thirty-eight inches thick, and the Moorehead mine farther up Stinking Creek is in about two and one-half feet of coal. On Lick Branch the bed is three feet thick, but a parting of three inches is included. On Moore's Creek the coal is twenty-five to thirty-four inches thick, but above that Creek and Mud Lick Branch the bed appears to split into several small seams which go below drainage a short distance above the mouth of Road Fork.

Blue Gem Coal.—This remarkable coal is made conspicuous along the railroad at and below Barbourville by several mines fronting the river there. The coal in the upper mine now operating was found about two feet thick and there, as in a number of small mines toward

Fighting Creek, probably ranges from two and one-half to three feet thick without partings.

Above Stinking Creek, at the mouths of the Chavies entry, on the left of the river, and of the Tiffany entries, on the right of the river, the coal is two and one-half feet thick, increasing inside to three feet, according to reports. Locally the coal is regarded as the Straight Creek or Jellico Coal and its proper identification seems to be in some doubt.



SMALL OPENING IN BLUE-GEM.

This is the main entry of the small operation of the Barbourville Electric Light Company, near the Louisville & Nashville station. Photo by W. R. Jillson, May 17th, 1919.

On Faulkner Branch the coal is only nineteen inches thick at the one place where opened and on Turkey Creek 26 inches. It goes below drainage within a mile of the mouth of this creek. On the head of Lick Branch it is two feet thick and on Moore's Creek (with correlation open to question) it is less than 2 feet.

The superiority of this coal is well known. The high price which it commands enables the mining of thinner

coal than would otherwise be profitable. Under very favorable conditions a thickness of two feet may be considered workable.

ANALYSIS BLUE GEM COAL.

G. 3849. Coal labeled "Specimen No. 1. 'Blue Gem' coal, Knox Gem Coal Co., Barbourville, Ky. Collected by W. R. Jillson, May, 1919. Air-dry mine-run."

The sample was about a 2 pound lump of bright coal, having a ferruginous incrustation on some surfaces and showing veins of pyrite. Received June 28, 1919, from W. R. Jillson, State Geologist.

Analysis	Air-dry Per cent.	Moisture-free Per cent.
Moisture	1.70	
Volatile Combustible Matter	42.00	42.73
Fixed Carbon	49.91	50.77
Yellowish-gray ash	6.39	6.50
	100.00	100.00
Sulphur	4.23	4.33
B. T. U. per pound of coal	13,760	14,000

Specific gravity, 1.298.

Analysis by W. D. Iler.

July 14, 1919. Alford M. Peter, Chief Chemist.

Bacon Creek Coal.—(Lower Blue Gem.) The bed of the Bacon Creek Coal, though seen in outcrop at a number of places, is opened in only two entries in this region, both of them showing only very thin coal with a parting.

Lily Coal.—The Lily bed is mined on Fighting Creek and Ramsey Branch, with two feet of coal. On Sandy Branch a mine with forty-three inches of coal at the mouth of the entry has only 23 inches, 80 yards in the drift. On Stinking Creek, near the mouth, the coal is two and one-half feet thick and on the Boone highway to Artemus, two feet.

The bed shows no parting but at the latter place a rider, 20 feet above the bed, is included in an excellent exposure of strata from the main bed to the top of the sandstone above the sides.

The Flat Lick Sandstone, which underlies Lily coal, is prominent in cliffs along the river near Artemus and also forms the base of the Flat Lick plateau.

CHAPTER III.

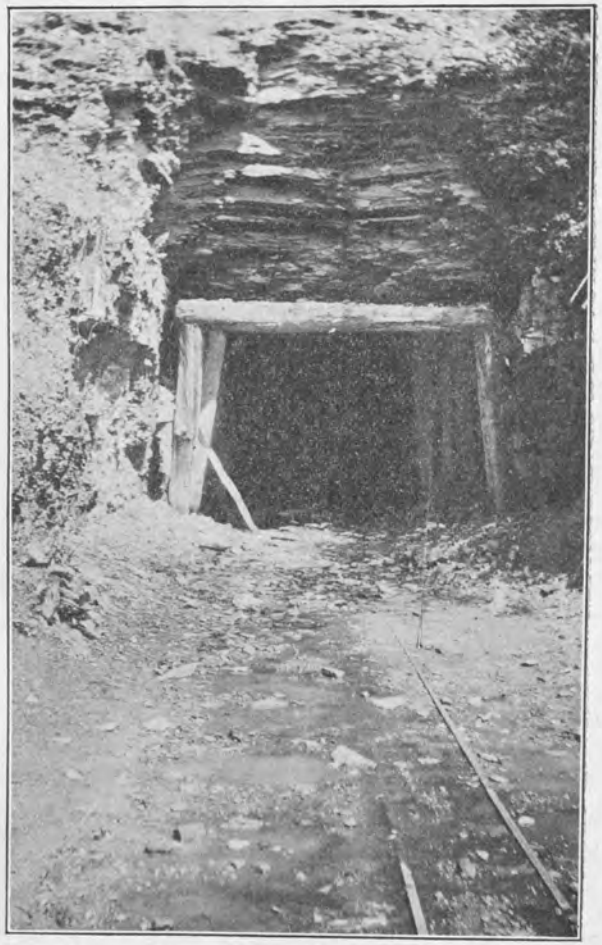
THE COALS OF THE BARBOURVILLE DISTRICT.

In the following details of coal opening examinations measurements of coal given in inches are exact, while thicknesses given in feet are approximate only. Distances given in yards are by estimation. Those given in miles are as obtained from maps or by reports or estimation. The distances up Stinking Creek as given, considerably exceed those by road, because the bends of the stream were included. From point to point above Lick Branch they should agree nearly with distances by road.

Altitudes of mouths of streams are given as nearly as they could be ascertained without levels. It is thought that they are not sufficiently in error to cause any material alteration in the deductions desired therefrom. Such correction of them as may be required will affect to a like amount the altitudes of coal openings in the vicinity obtained by barometer from them as bases. Inaccuracies of the barometer will account for many minor apparent variations of dip and of intervals between coals.

Where one of two splits of a bed was found, without means of determining which one, that split is designated as if it were the main bed. The terms left and right are used as when looking up stream. Those are designated as wet entries which had water in them preventing access to the face.

The Barbourville railroad station (960 alt.) is about on a level of the Bacon Creek coal bed. Openings into the Blue Gem coal, visible from the railroad, from Richland Creek to that station show the bed lying very nearly level on a southeast course to within ¼ mile of the station and then rising about 30 feet to 65 feet above the railroad and to altitude 1025 at the station. At the mine where the rise begins the coal is 24 inches thick 25 yards



A BARBOURVILLE BLUE-GEM ENTRY.

The hammer shows the base of the Blue-Gem seam with the underlying shale. Old main opening of the Knox-Gem Coal Company, at Barbourville, Kentucky. Photo by W. R. Jillson, May 17th, 1919.

in, its shale roof replacing in part the 30 foot sandstone cap-rock of the mines nearer Richland Creek.

The base of a 15-foot cliff above the now closed opening at the station marks the approximate place of the Straight Creek coal bed, at altitude 1080, and above that, at altitude 1165 is the approximate place of the Moss

coal, under a 10-foot cliff. Benches at both places have been formed about 10 feet lower.

A closed entry, ⅛ mile above the station (southeast), gives the Blue Gem coal with sandy roof at altitude 1065.

In a left hollow, ¼ mile above the station, ¼ to ⅜ mile up it, are seven entries into the same bed at altitude about 1065. Of these entries one shows only earth covering, two of them thin shale under earth, two thick shale (5 to 10 feet), one sandy shale and one thick, soft sandstone.

At the head of the left hollow, ¾ mile from the station, ⅛ mile up from the wagon road, are three small mines into the Blue Gem coal at altitude 1080, one of them having 25 inches of coal, 12 yards in, under 8 feet of shale.

Loose quartz pebbles lie along the nearly level road from its forks ⅞ mile above the station, for ⅛ mile farther up, after passing a slight rise in the road, corresponding to the slightly dipping southeast stratification across the flat, indicated by openings south of Fighting Creek.

FIGHTING CREEK.

On the left, 1¾ miles above Barbourville.

On the right of the creek, 5 feet above it, are two small mines, one on each side of and at the road to Artemus. One of them gives the following bed-section 2 yards in:

Lily Coal.

Shale	3″
Coal	23″
Black slate	6″

Altitude, 950.

The bed is reported to have thin coal about 15 feet above it. It is at stream level about ¼ mile up Fighting Creek from the road, altitude 940.

On the left of the road to Artemus, 2 miles from Barbourville, the "Box Boy" mine has the following bed-section 2 yards in:

Straight Creek Coal.

Massive sandstone	15	Feet
Coal	26″	
Clay and shale	6	Feet

Altitude, 1,120.

White clay at altitude 1,000 in the road 2⅛ miles from Barbourville is probably from the rider of the Lily bed. In the road to a mine on the left at this place, the stain of the Blue Gem coal shows at altitude 1065. Above the stain the mouth of a long entry at altitude 1140 shows 21 inches of coal of the Straight Creek bed under 3½ feet of massive sandstone, the interval to the Blue Gem bed here being estimated at 65 feet.

The height of this entry, 1140 above the Lily coal under the road, say 985, corresponds nearly with the normal interval between the Bacon Creek and Lily coals, but a rise of strata of perhaps 150 feet in the ⅜ mile from the entry to the road is assumed, such as is clearly shown on the head of a branch 1½ miles above Stinking Creek and near old Flat Lick. The character of the beds and of their coverings and intervals at this entry and others toward Artemus seem to leave no room for doubt as to their correlation, nor, with the several openings which have been made into it and other evidences, does it appear possible that the lowest bed can be other than the Lily.

At 2¼ miles above Barbourville the top of the sandstone under the Lily coal is at altitude 1,000.

On the right of a left branch, 2½ miles above Barbourville, on the right, ½ mile up the branch, the Straight Creek bed, at altitude 1,150, has 24 inches of coal 4 yards in a long entry, and it is reported that the coal ranges from 24 to 28 inches.

The roof is of massive sandstone, 2½ feet exposed, and the floor 4 feet of clay and shale.

The probable top of the sandstone, showing as a cliff on the right of the road 2½ miles from Barbourville, is at altitude 1,030, and the stain of the Lily coal or rider, by the road 2¾ miles up, is at altitude 1,005. The easterly dip which these figures indicate might be questioned,

but is verified by the entries opened on a like dip on Little Brush Creek near its mouth.

On the right at the head of a left hollow, 3⅛ miles from Barbourville, the Moss bed has been mined at altitude 1,250. The clay of the Straight Creek bed shows in the road to the mine, at altitude 1,150.

On the left, 3¼ miles above Barbourville, the following section was obtained 20 yards in the Frank Maxsie mine, recently reopened. Formerly its coal was delivered into Artemus by inclined plane, but now it is hauled down in wagons:

Moss Coal.

Bituminous shale	2	Feet
Coal	19″	
Clay	1″	
Coal	8″	
Shale	3″	
Coal	17″	
Fire clay.		

Atitude, 1,250.

The upper parting is said to increase beyond the crest of the ridge over the mine to 8 to 10 feet. The mining area is small.

The Lily bed is about at the level of the railroad station at Artemus and loose pebbles are scattered in the field on the left near the river, ⅛ mile above the school house and ½ mile above Brush Creek. Coal, of the Lily bed, at altitude 960, is said to have been taken from the bank of the small stream just above there. The sandstone under it shows in the river bank below the mouth of the branch.

RAMSEY BRANCH.

On the left, ½ mile above Artemus.

On the left, ¼ mile up and at the branch, a small mine has 24 inches of coal, 6 yards in under 20 feet of shale. This is of the Lily bed at altitude 950.

The stain of the Lily coal shows at altitude 980 just under the railroad at the forks of the road on the left of Cumberland River and of Stinking Creek at its mouth.

A foot of fire-clay only intervenes between the coal and the top of the hard sandstone below.

On the left, ½ mile above Stinking Creek, Fred Chavies has a 5-yard entry into the Bacon coal, and a small mine in the Blue Gem bed. Following are bed-sections in the entry and at the mouth of the mine, the coal in the mine reported 24 to 30 inches thick:

Straight Creek Coal.

Prospect (reported).
Altitude, 1,245.

Blue Gem Coal.

Clay.	
Coal	29″

Altitude, 1,185.

Bacon Coal.

Sandy shale	8 Feet
Coal	8″
Shale	7″
Coal	13″

Altitude, 1,135.

Lily Coal.

(Approximate place).
Altitude, 1,000.

The Straight Creek bed is near the top of the hill. The coal is said to rise sharply in the mine, but before reaching the center of the ridge (perhaps 50 yards) the dip reverses to a rapid fall. This is the first exhibition of an anticline, strongly accentuated near Flat Lick and probably culminating in White Mountain.

Strata in the long railroad cut to the spur track at Himyar, 1 mile above Stinking Creek, show a gradual rise, bringing the top of the sandstone below the Lily coal to the level of the church there, at altitude 1,025, and 25 feet above the railroad. From this point the Flat Lick plateau can be followed by eye easily to the old Flat Lick settlement, a mile from its railroad station.

Also it is clearly evident on the head of a left branch, ½ mile south of old Flat Lick, where the following section was obtained in an exposure and entry beside the road:

Coal stain.
Altitude (corrected for dip), 1,120.
Hard thin sandstone.

Shaly sandstone	10 Feet
Coal	6″
Shale	35 Feet

Lily Coal.

Coal	18″

Altitude, 1,085.

The entry at the bottom of the section is on the Flat Lick plateau and at the base of the ridge between it and old Flat Lick. Strata rise rapidly toward the summit of the ridge and fall at a like rate on its northern side, where the road is on the exposed sandstone.

Sandy Branch.

On the left at Flat Lick station.

On the right, 1¼ miles up this branch, the Lily bed has 30 inches of coal, 5 yards in a wet entry, under 3 feet of shale and at altitude 1,070.

The Flat Lick Coal Company was in extensive operation, when visited, of a mine 80 yards farther up the branch, having the following bed-section 2 yards in:

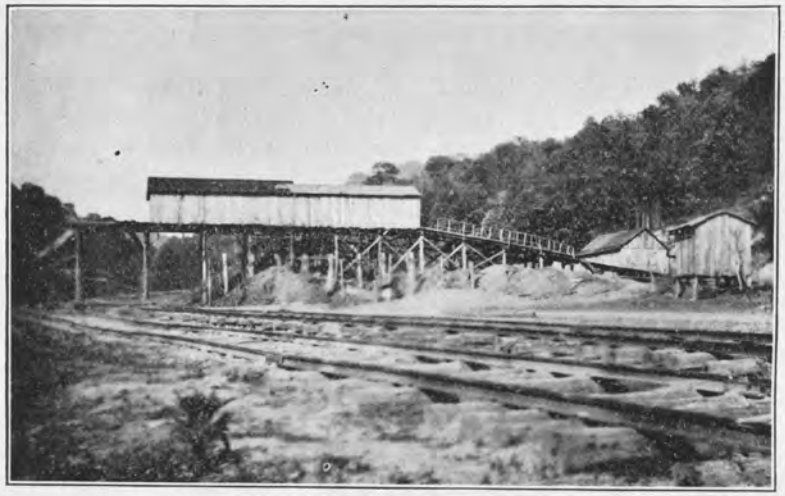
Lily Coal.

Black slate	7 Feet
Coal	43″
Clay	2″

Altitude, 1,050.

The black slate roof becomes a laminated sandstone inside the mine. The coal has imperfect cleavage, is in part slickenseit, but all appears to be of excellent quality. A pyrite band of varying thickness appears in parts of the mine. At 20 yards in the mine the bed begins suddenly a sharp easterly rise and in conjunction thins rapidly, but is still 23 inches thick at the face 80 yards in.

The mine appears to have entered on the northern side of and near the anticline, running from below Arte-



FLAT LICK COAL OPERATION.

The view shows the tipple and location of the main entry of the Flat Lick Coal Company, at Flat Lick, Knox County, Ky. The railroad spur in the foreground, three-quarters of a mile long, connects this mine with the Cumberland River main line of the Louisville & Nashville Railroad. Photo by W. R. Jillson, May 16, 1919.

mus to White Mountain, and to be approaching the axis, where the pitch of strata is most pronounced.

In Bulletin No. 14 of the Kentucky Geological Survey the Blue Gem coal is given at three openings "on the right, towards the head of the branch," at altitudes 1,362, 1,358 and 1,355. These are evidently on the northern slope of the anticline, and, being about 300 feet higher than the Lily coal opening, would appear to be of the Straight Creek bed. It is reasonable to assume, however, that the latter rises some 70 feet to points beneath the openings.

No investigation for this report was made along the river from Barbourville to Brush Creek, coal openings, if any, being few and of no especial interest.

Brush Creek.

Only openings below the Moss coal were examined here.

Gregory Branch.

On the left, ⅛ mile up Brush Creek.

On the left, ½ mile up the branch, 10 feet above it, at the mouth of a 6-yard entry, the following section was obtained:

Lily Coal.

Thick shale.	
Sandstone	3 Feet
Shale	8 Feet
Coal about	20″

Altitude, 960.

On the left, ¾ mile up the branch, the Lily rider, about 20 feet above the main bed, shows in outcrop 1 foot of coal in shale, at altitude 980.

On the left, 1 mile up, at a 2-yard entry, the Lily coal, under 3 feet of shale, is 14 inches thick and at altitude 985.

On the left, 1½ miles up, the Straight Creek coal is 1½ feet thick at the mouth of a 3-yard entry under 3 feet of sandstone and at altitude 1165.

On the right, ⅛ mile up a left branch, 2 miles up Gregory Branch, a new entry into the same bed has 2 to 2½ feet of coal under 8 feet of massive sandstone and on 5 feet of sandy shale. Its altitude is 1,165.

On the left, ¼ mile up Brush Creek, the stain of the Bacon Coal, under white clay, shows by the road at altitude 980.

Owen Branch.

On the left, ½ mile up Brush Creek.

The Blue Gem coal has been taken from a pit in the branch, ¾ mile up it, and at altitude 970.

On the left at this point a closed entry gives the altitude of the Straight Creek coal as 1,030.

On the left, ¾ mile up Brush Creek, a small mine gives the following at its mouth:

Straight Creek Coal.

Shale and sandstone	6 Feet
Sandstone	6″
Coal	27″
Fire clay	2 Feet

Atitude, 1,040.

Strata along the creek show a continuous up-stream dip from Gregory Branch to about 1 mile up, and then a slight rise becoming more rapid up the first half mile of Little Brush Creek, on the right, 1½ miles up. Several entries along this half mile show the Straight Creek coal about at stream level and under thick massive sandstone.

Bulletin No. 14 shows the Dean coal nearly level along the ridge between Greasy and Brush Creeks with its opening nearest the Straight Creek coal openings, at altitude 1585, about 550 feet difference between the two beds and about the interval between the Moss and the Dean coals. The southward dip on the lower part of Brush Creek and eastward dip on Little Brush Creek continued to a point under the Dean coal would easily bring the Straight Creek coal 650 below it, corresponding to the interval at Wallsend.

The character of the Straight Creek bed and its covering in this vicinity differ so materially from that of the Moss bed and covering that they are little likely to be mistaken one for the other. The lower bed is a solid coal under massive sandstone as already shown; the upper bed has two partings and shale or slate roof as at Artemus and as on Greasy Creek in several openings reported in Bulletin No. 14, page 119.

On the right of the river, 1 mile above Brush Creek, loose pebbles are abundant in and by the road at altitude 990. In addition there are a few small pieces of conglomerate and a 30 pound boulder on sandy soil.

On the right, ⅛ mile up a right hollow, 1½ miles above Stinking Creek, the Tiffany Coal Company has a mine, giving the following at its mouth:

Blue Gem Coal.

Sandy and bituminous shale.....	15 Feet
Coal (reported 30″ at face).....	26″

Altitude, 1,100.

A new entry on the right of the river just above the mouth of the drain is at altitude about 1,090. The character of the roof here (shown best in the dumps), black clay and clay shale interleaved with white shale and shaly sandstone, leaves no question of the correlation of

this bed with the Chavies mine ½ mile above Stinking Creek. A fossil, part of a calamite stem (?) was found in the black clay, and others were reported there as well as at the Chavies mine.

Preparations were nearly made to deliver coal by overhead wire to a railroad spur across the river.

In a right drain on the right of the river, ¼ mile above the hollow last mentioned, the Blue Gem coal is 31 inches thick 1 yard in one of two short entries, at altitude 1,010, and is under 8 feet of shale and then 15 feet of shaly sandstone.

From this drain to near Greasy Creek, where the Blue Gem bed is about at river level, no coal is now open on the right of the river.

CHAPTER IV.

THE COALS OF STINKING CREEK.

The altitude of the mouth of this creek is assumed to be 930 feet, about 60 feet below the Louisville & Nashville railroad trestle. The creek at low water is about 30 feet below the Boone Highway bridge. The stain of the Lily coal, at altitude 980, at the road forks by the railroad, has been mentioned previously.

On the left by the road, ¼ mile up the creek, Finley Mayo has the Lily bed opened in a 15-yard entry, having 29 inches of coal at the face and under 5 feet of bituminous shale. Its altitude is 980. In the entry the bed rises to the northwest and then dips at a 10% rate or more. This may be due to passing over the anticline from White Mountain, but seems more likely a local roll resulting from that uplift. A bench on the opposite side of the valley, formed by the hard sandstone under the coal, lies flat.

FAULKNER BRANCH.

On the left, ⅞ mile up the creek: Altitude of mouth, 935.

On a right branch, ¾ mile up Faulkner Branch, on the right, ⅛ mile up the right branch, the mouth of an entry shows 19 inches of coal on 2 feet of fire-clay and under 8 feet of shale, at altitude 1,085. A closed entry 1 mile up the main right branch gives the altitude of the same bed 1,065, and ½ mile more westward, on the head of a branch of Fighting Creek, 1,045, at a closed entry there.

Assuming a southeastward rise of strata of 40 feet from the first of these entries to Stinking Creek, the bed would be 145 feet above the Lily bed and in the place of the Bacon coal, but in view of the greater prominence of the Blue Gem it seems probable that the rate is about twice as great and that this bed is the Blue Gem.

On a right branch with mouth at altitude 935, one mile up Stinking Creek, on the left, ⅛ mile up the branch, Mrs. Keel has a long entry, under 3 feet of bituminous shale, having 2½ feet of coal 1 yard in. This is of the Lily bed at altitude 980.

TURKEY CREEK.

On the left, 2 miles up Stinking Creek: Altitude of mouth, 945.

On a right branch at the mouth of Turkey Creek, ⅛ mile up and in the Dixie Highway to Artemus, a coal stain at altitude 965 is of the Bacon bed.

On the left, ⅜ mile up the branch, on the right of a cove there, the Woodson mine has the following bed-section 2 yards in:

Straight Creek Coal.

Sandstone	5 Feet
Sandy shale	10 Feet
Black slate	5″
Coal	23″
Hard floor.	

Altitude, 1,140.

The coal is probably 2½ to 3 feet thick within the mine.

On the left branch with mouth at altitude 955, ¼ mile up Turkey Creek and on the Dixie Highway, at the head of a right drain at the mouth of the branch, Milton Scalf has a closed entry with the following section 2 yards in:

Straight Creek Coal.

Earth.	
Coal	8″
Shale	15″
Black slate	21″
Shale	11″
Coal	20″
Shale.	

Altitude, 1,105.

On the left, 7/8 mile up the branch, the Callahan entry, and on the left, 1 mile up, the abandoned Turner entry, give the following bed-sections, 4 yards in each:

Straight Creek Coal.

Callahan.		Turner.	
Sandstone	5 Feet	Sandstone	1 Foot
Coal	6″	Shale	1 Foot
Knife-edge parting.		Sandstone	5 Feet
Coal	4″	Coal	5″
Shale	3″	Knife-edge parting.	
Coal	22″	Coal	6″
Altitude, 1,060.		Shale	3″
		Coal	21″
		Altitude, 1,050.	

On the left, ½ mile up Turkey Creek, Abraham Carnes is opening an entry into the Blue Gem coal at altitude 1,020, having 20 inches of coal on 1 foot of fire-clay and under 15 feet of soft shale with white clay at the bottom.

On the right, ½ mile up the creek, Daniel Faulkner has a 50-yard entry into the same bed, and closed prospects above it, which give the following data, the lowest coal as measured at the face of the entry:

Moss Coal.

Massive sandstone.
Black slate.
Reported coal.
Altitude, 1,210.

Straight Creek Coal (Upper Split?)

Shale	8 Feet
Coal stain	3″
Earth.	
Coal stain	4″
Altitude, 1,120.	

Blue Gem Coal.

Shale	5 Feet
Coal	26″
Fire-clay.	
Altitude, 1,015.	

The Straight Creek bed may be 2 or 3 feet thick. The excessive interval between that bed and the Blue Gem is attributed in part to barometric error and in part to a thickening of strata between the two beds.

Right Fork.

On the right, 5/8 mile up Turkey Creek: Altitude of mouth, 965.

Sugar Camp Branch—On the right, ¼ mile up Right Fork: Altitude of mouth, 985.

On the left, ½ mile up the branch, C. Bailey has a wet entry, and on the right, opposite, a long entry having the following section at the mouth and a few yards in, respectively:

Moss Coal.

On Left.		On Right.	
Shaley sandstone	4 Feet	Sandstone	1 Foot
Coal	1 Foot	Coal	30″
Clay shale and shaly sandstone	8 Feet	Fire-clay	1 Foot
Impure coal	6″	Sandstone.	
Coal	28″	Altitude, 1,220.	
Black slate	1″		
Fire-clay	1 Foot		
Altitude, 1,215.			

The resemblance of the section on the left to that of a prospect 4 miles up Stinking Creek is especially noticeable.

On a left branch, with mouth at altitude 980, 1½ miles up Turkey Creek, on the right, at branch level, ½ mile up the branch, James Black has a 6-yard entry with the following section at its mouth:

Straight Creek Coal.

Shaly sandstone.	
Shale	6″
Coal	5″
Shale	1″
Coal	3″
Shale	15″
Coal	3″
Shale	14″
Coal	22″
Fire-clay.	
Altitude, 1,045.	

Left Fork.

On the left, 2 miles up Turkey Creek: Altitude of mouth, 1,025.

A stripping of coal on the right, ⅛ mile up the fork, is at altitude 1,060. This bed is also shown on the main creek ½ mile above Left Fork.

Up a right branch, 1¼ miles up the fork, then ¼ mile up its right branch, then ⅛ mile up a right branch of the latter to Arthur & Company's long entry, having the following bed-section 4 yards in:

Dean Coal.

Sandstone	5 Feet
Coal	21″
Shale	4″
Coal	11″
Fire-clay.	
Altitude, 1,340.	

If correlations are correct, the Straight Creek bed, being nearly 600 feet below the Dean coal, is at altitude about 740, involving a dip from the Faulkner prospect of more than 2% between the two points.

On a right branch, with mouth at altitude 1,045, 2⅜ miles up Turkey Creek, on the left, ⅛ mile up the branch, the face of a 2-yard entry in a roll, at altitude 1,060, has 17 inches of coal under 3 feet of shaly sandstone. This appears to be the upper seam of the Moss coal.

On the left, at and 25 feet above the forks of this right branch, is the following bed-section, 1 yard in a wet entry:

Howard (?) Coal.

Shale	20 Feet
Black slate and bituminous shale	4 Feet
Coal	28″
Fire-clay	1 Foot
Sandstone.	
Altitude, 1,225.	

On the right, 2½ miles up Turkey Creek, a stripping at altitude 1,065, gives the following: The coal probably drops to some 20 feet beneath the coal in a roll on the branch just preceding:

Moss Coal. Lower Seam.

Shale	10 Feet
Coal.	
Fire-clay.	
Sandstone.	
Altitude, 1,050.	

On the right, 2⅝ miles up Turkey Creek, Edward Hammond has a 15-yard entry with the following bed-section at its face:

McGuire Coal.

Sandstone	5 Feet
Shaly sandstone	3 Feet
Shale	2″
Coal	6″
Knife-edge parting.	
Coal	1″
Shale	6″
Coal	30″
Fire-clay.	
Altitude, 1,465.	

On the left, 2¾ miles up Turkey Creek, and at its upper forks, the following bed-section was obtained 3 yards in a long entry:

Dean Coal.

Sandstone	8 Feet
Coal	20″
Shale	4″
Coal	8″
Fire-clay.	
Sandstone.	

Altitude, 1,415.

On a right branch with mouth at altitude 955, 3¼ miles up Stinking Creek, and on the Dixie Highway, Robert Corum and William Stevens have entries ¼ mile up the branch. The long one on the left has the following bed-section 1 yard in:

Lily Coal.

Sandstone cliff	10 Feet
Shale	5 Feet
Coal	11″
Shale and clay	20 Feet
Coal	25″

Altitude, 980.

The coal is no thicker at the mouth of a closed entry on the right, but a new entry was being opened, nevertheless, beside it.

A stripping on the left by the road, ½ mile up the branch, gives the following section, strata rising rapidly southeastward:

Lily Coal.

Sandstone	3 Feet
Shale	8 Feet
Coal	1 Foot
Fire-clay	3 Feet
Hard sandstone.	

Altitude, 1,005:1,015.

The bed-rock, the top of the sandstone, is the basis of the Flat Lick plateau.

In the road to Himyar, ⅝ mile up the branch, are loose pebbles at altitude 1,020, lying on this sandstone. They may be accounted for either as formerly water-carried from a distance or as the sole remainder of a sandstone formerly over the now gone Lily coal at that place.

Following the road to Flat Lick the top of this sandstone rolls over the slight divide to Lick Branch and descends about with the road to Flat Lick.

On the left, 3½ miles up Stinking Creek, 15 yards in the William Stewart mine, the following bed-section was obtained:

Straight Creek Coal.

Shale	12 Feet
Coal	28″
Black slate	1″
Fire-clay.	

Altitude, 1,130.

The cliff sandstone over the Corum entry of the preceding page dips down stream more rapidly than the branch falls and its top is probably the creek bed at the ford, ⅛ mile above the mouth of the branch, so that the Lily coal there is about at altitude 920, over 200 feet below the Stuart mine.

On the left, 4 miles up Stinking Creek, D. C. Morehead has a prospect into the Moss bed and an 8-yard entry into the Straight Creek bed as given following, the latter coal as measured at the face of the entry:

Moss Coal.

Shale.	
Coal	1 to 1½ Feet
Shale and earth	9 Feet
Coal	18″

Altitude, 1,225.

Straight Creek Coal.

Shale	2 Feet
Coal	23″
Fire-clay	1 Foot

Altitude, 1,140.

Correlation of the upper coal here with the coal of Sugar Camp Branch, Turkey Creek (about 2 miles northeast) is required by the sections at the two places. A cessation of the rapid dip from the southeast therefore results, though it is continued in less degree northeast from Sugar Camp Branch.

On a left branch with mouth at altitude 955, 4½ miles up Stinking Creek, D. Jackson has a 1-yard entry in which is the following bed-section:

Straight Creek Coal.

Shale	8 Feet
Coal	1″
Clay	10″
Coal	31″

Altitude, 1,140.

An outcrop of 10 inches of coal at altitude 1,030 in the road on the left, 4¾ miles up Stinking Creek, is of the Bacon bed.

LICK BRANCH.

On the right, 4¾ miles up Stinking Creek: Altitude of mouth, 970.

An outcrop on the left by the road, ⅛ mile up the branch, about 6 inches of coal at altitude 1,005, under 3 feet of rough sandstone, is of the rider to the Bacon bed.

In a left branch ⅛ mile up Lick Branch, ¼ mile up the left branch, an outcrop showing a foot of coal (with possibly more below), under 5 feet of sandstone and at altitude 1,095, is of the Straight Creek bed.

On the left at this point a closed entry with apparently about 2 feet of coal at altitude 1,200, under 15 feet of shale is in the Moss bed.

Right Fork.

On the right, ¾ mile up Lick Branch: Altitude of mouth, 980.

On the left of a right branch, ⅛ mile up Right Fork, ¼ mile up the branch, a stripping in the northwestern end of old Flat Lick is reported to have 30 inches of coal. It is covered by white clay, the remainder from disintegrated sandstone, containing conglomerate pebbles, over which is a few feet of earth, the whole overburden about 5 feet. It is of the Lily bed at altitude 1,025.

On the left, ¾ mile up Right Fork, Arch Campbell has a closed entry with the following section 2 yards in:

Bacon Coal.

Shale.	
Coal	3″
Black slate	8″
Coal	15″

Altitude. 1,170.

On the left, ¾ mile up Lick Branch: Altitude of mouth, 985.

A prospect on the left, ¾ mile up the fork, at altitude 1,065, gives white clay, but was not carried far enough to reach coal. It is apparently the place of the Lily rider and the main bed should be found 20 feet below.

On the left, 1 mile up the fork, John A. Black has 20-yard entries with sections as follows, the upper one measured half way in and the lower at the face:

Straight Creek Coal.

Coal	9″
Clay	12″
Coal	24″

Altitude, 1,370.

Blue Gem Coal.

Sandy bituminous clay	2½ Feet
Coal	24″
Fire-clay	2½ Feet

Altitude, 1,300.

The roof of the lower entry is somewhat similar to that of the Chavies and Tiffany mines on the river between Stinking Creek and Flat Lick. This entry dips northward about ½% at the mouth, increasing to about 5% at the face, but no such dip was noted in the one above it.

On the right, 1 mile up the fork, 20 feet over it, an unfinished prospect shows a coal stain of 3 inches under white clay, at altitude 1,065. This appears to be of the Lily rider.

On the left, 1⅛ miles up the fork, Mr. Black has a wet entry into the Bacon bed, probably, at altitude 1,170, having, 1 yard in, 25 inches of coal on a hard floor and under 3 feet of laminated sandstone.

In this vicinity, 2 miles northeast of old Flat Lick and on the way to the head of Moore's Creek, possibly on Sandy Branch, on the right of the stream, the following was found years ago:

Moss Coal.

Coal	20″
Shale	2″
Coal	20″

Altitude, 1,480.

This corresponds well with the Moss coal as found on Greasy Creek (Bulletin 14), but with one less seam of coal here and much thinner parting.

MOORE'S CREEK.

On the right, 5¾ miles up Stinking Creek: Altitude of mouth, 980.

The correlations now adopted of openings on this stream differ from those given in Bulletin No. 14 and are still open to question. Justification for the change is found in the increased information now in hand, but more is needed to a satisfactory solution of the problems involved, especially complicated by reason of proximity to the anticline running along the creek toward White Mountain.

On the right, ½ mile up Moore's Creek, the Epperson now closed entry is given, in Bulletin No. 14, the following section, by report 40 feet above the creek and dipping southwest nearly 15%.

Blue Gem Coal.

Shale.	
Coal	3″
Shale	3″
Coal	20″
Sandrock.	

Altitude, 1,030.

SIMMONS BRANCH.

On the left, 1 mile up Moore's Creek: Altitude of mouth, 1,020.

On the right, ⅛ mile up the branch, James D. Walker has a long entry having the following bed-section 3 yards in:

Straight Creek Coal.

Sandstone	4 Feet
Shale	8 Feet
Coal	25″

Altitude, 1,060.

The bed dips to the northeast, being about 15 feet lower at an abandoned entry 100 yards farther up the branch, where the coal is 26 inches thick under 10 feet of massive sandstone. Bulletin 14 gives the thickness of coal as 32 inches, to which it doubtless reaches well within the entry. Evidently there is an anticline between this and the Epperson entry.

Sandstone at creek level on the right, 1¾ miles up, apparently pitching steeply northeastward showing the anticline here to be southwest of and not far from the forks of the creek, is possibly only cross-bedding such as shows under the Moss coal, 9¼ miles up Stinking Creek.

RIGHT FORK.

On the right, 1¾ miles up Moore's Creek: Altitude of mouth, 1,060.

On the left, ⅛ mile up the fork and by the road, an outcrop of the Moss coal shows 32 inches or more thick, on sandstone, at altitude 1,120. Beyond and above this outcrop its rider outcrops with a foot of coal, with shale floor and 25 feet of shale upon it. The dip of strata down stream prevented getting the interval to the main bed, but it appeared to be less than 20 feet.

On the left, ⅜ mile up the fork, John A. Black (formerly Gregory) has an 8-yard entry into the Moss coal, under 10 feet of thin bedded sandstone, having 33 inches of coal at the face and at altitude 1,150. The entry pitches northeastward 15% or more.

On the left at the mouth of a left branch, ⅛ mile up the fork, closed entries show 34 inches of Moss coal, at altitude 1,155, with slight northeasterly dip.

Gregory or Mud Lick Branch.—On the right, ⅝ mile up Right Fork: Altitude of mouth, 1,120.

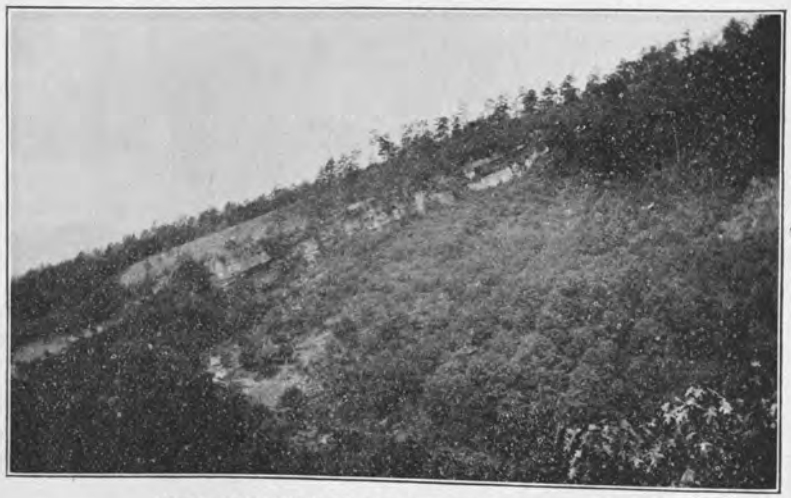
For the first ⅛ mile up this branch strata dip southwestward at a 10 to 20 degree rate.

On a right branch, ½ mile up Gregory Branch, ⅛ mile up the right branch to its left fork and ¼ mile up the latter, on the left at its head, John A. Black has a 12-yard entry with the following section half way in:

Moss Coal.

Shale.	
Coal	24″
Clay	2″
Coal	22″

Altitude, 1,420.



THE MOUNTAIN MAKING POTTSVILLE.
It is this strong, erosion resisting Lee Conglomerate that is responsible for the present topographic figure of Pine Mountain. The strata dip at an angle of 25 degrees to the southeast. The crustal forces which caused this immense fold and fault were the same ones which were responsible for the Flat Lick, Moore's Creek and White Mountain disturbances. Photo by W. R. Jillson, May 16, 1919.

This corresponds in section so nearly with the upper coal, altitude 1,480, found near the head of Lick (or Sandy) Branch, as to warrant correlation with it. It is, however, only about a mile from the next preceding entry, also judged to be in the Moss bed, and what strata were seen between the two places, differing in altitude 265, pitch in the wrong direction for establishing the correlation. An extremely southeasterly rise of strata farther up stream than those seen dipping in the opposite direction, or even a fault along the anticline is inferred. The Flat Lick and Moore's Creek anticlines converging to White Mountain, 2 or 3 miles southwest, seem to warrant either supposition.

On the left, 1½ miles up Right Fork, the following was found in early exploration:

McGuire Coal.

Shale	8 Feet
Cannel coal	7″
Coal	11″

Altitude, 1,655.

Left Fork.

On the left, 1¾ miles up Moore's Creek: Altitude of mouth, 1,060.

On the right, ¼ mile up the fork, Frederick Spurlock has a long entry with the following bed-section 1 yard in:

Moss Coal.

Massive sandstone	6 Feet
Coal	3″
Clay	4″
Coal	26″

Altitude, 1,110.

Stains in the road on the left, ⅝ mile up the fork, give the altitude of the Moss coal at 1,130 and of its rider 1,145, showing the Spurlock entry to be in a local depression. The rider corresponds to that found over the Morehead entry 4 miles up Stinking Creek.

On the right, ¾ mile up Left Fork, 10 feet above it, Alexander Walker has a 2-yard entry dipping about 5% southeastward in which is the following bed-section:

Moss Coal.

Shale	5 Feet
Coal	1″
Knife-edge parting.	
Coal	13″
Shale	2″
Coal	6″
Fire-clay.	

Altitude, 1,105.

On a right branch, 1¾ miles up Left Fork, on the left ⅜ miles up the branch, a closed entry into a bed not over 2 feet thick is at altitude 1,490 (?) and probably of the Dean bed.

On the right, ½ mile up the same branch, a prospect and closed entries (one being reopened when visited) gave the following:

McGuire (?) Coal.

Shale	4 Feet
Coal	8″
Shale	2″
Coal	25″
Shale	8″
Coal	6″
Fire-clay (level floor).	

Altitude, 1,540 (?)

The interval between the two beds and the appearance of the upper, high on the ridge, are indicative of the correlation assumed. The altitudes obtained are probably too low.

Between the upper fork, 2¼ (?) miles up Left Fork, cannel coal 23 inches thick was formerly found, at altitude 1,650. This is probably of the McGuire bed.

MUD LICK BRANCH.

On the left, 6 miles up Stinking Creek: Altitude of mouth, 980.

On the right, ¼ mile up the branch, Mrs. Daniel Bingham has a long entry with the following bed-section as given in Bulletin 14.

Straight Creek Coal.

Sandstone.	
Sandy shale	10 Feet
Coal	21″
Shale	11″
Coal	12″
Fire-clay.	

Altitude, 1,140.

The parting is 4 inches thicker than at the mouth of the entry and the bottom coal 7 inches thicker.

Across the branch, opposite the preceding entry, is another, at altitude 1,220, of the Moss coal, reported 36 inches thick without parting, and apparently of that thickness.

In Bulletin 14 these two entries are called of the Blue Gem and Straight Creek beds, but they seem to be clearly too high for such correlation.

Coal 20 inches thick, at altitude 1,040, ½ mile up the branch, is probably of the Bacon bed.

On the right, 1½ miles up the branch, ⅛ mile up its left fork (?) a prospect formerly gave the following section:

Howard Coal.

Shale	10 Feet
Coal	8″
Shale	6″
Coal	22″
Knife-edge parting.	
Coal	12″
Shale	½″
Coal	6″

Altitude, 1,450.

As stated in Bulletin 14, Mr. Thurston opened a bed of similar section on the Noah Wiggins place on Fighting Creek, 3 miles northeast of Barbourville, which may be of use in future correlation there when its altitude is known.

On the right, 6⅜ miles up Stinking Creek, and on the left 6½ miles up, are wet entries, the latter Richard Walker's, with the following sections at their mouths:

Straight Creek Coal.

On Left.		On Right.	
Shale	10 Feet	Shaly Sandstone	5 Feet
Coal	19″	Shale	1 Foot
Bituminous shale	9″	Coal	1½ Feet
Coal	7″	Altitude, 1,080.	
Altitude, 1,100.			

Looking from a broad bench on the left, 7 miles up, altitude 1,070, dip of strata from close under the Walker entry to the mouth of Road Fork is evident from the topography.

On a left branch, 7½ miles up the creek, on the left at its mouth, a closed entry into the Straight Creek bed, having possibly 2 feet of coal and under 15 feet of shale is at altitude 1,040.

ROAD FORK.

On the left, 7¾ miles up Stinking Creek: Altitude of mouth, 1,000.

On a left branch, ⅛ mile up this fork, on the left, ¼ mile up the branch, a closed prospect, reported in a bed 4 feet thick, is at altitude 1,500.

On the right, ½ mile up the branch (on its left fork) a closed prospect, also reported of a thick bed is at altitude 1,555. These two openings appear to be in the Dean and McGuire coals.

On a left branch with mouth at altitude 1,010, ⅞ mile up Road Fork, William Mills has a prospect on the right ¼ mile up, into thin coal, probably of the Moss bed, at altitude 1,085.

On the left, ½ mile up, he has a wet entry of the following bed-section 6 yards in:

Howard Coal.

Shaly sandstone and shale	8 Feet
Coal	18″
Shale	1″
Coal	18″
Altitude, 1,255.	

This corresponds in section with the upper Mud Lick Branch opening, 6 miles up Stinking Creek, omitting the upper seam of coal and lower parting there.

BRICE'S CREEK.

On the right, one mile up Road Fork: Altitude of mouth, 1,010.

On a right branch with mouth at altitude 1,020, ¼ mile up this creek, on the left, ¼ mile up the branch, Richard Williamson has a wet entry with a following bed-section 1 yard in:

On the right, ⅜ mile up the creek, Frank Hammond has a long entry with the bed-section 5 yards in also following:

Williamson.		Hammond.	
Sandy shale	10 Feet	Shale	15 Feet
Coal	12″	Coal	6″
Cannel coal	15″	Cannel Coal	23″
Altitude, 1,450.		Altitude, 1,450.	

On a left branch with mouth at altitude 1,055, ¾ mile up Brice's Creek, on the right, ¼ mile up the branch (Middle Fork), Edward Shelton has a prospect showing 18 inches of coal under 3 feet of shale, at altitude 1,245. This is the Mills bed.

On a right branch, 1½ miles up the creek, a now closed entry of James Walker's, has the following section as given in Bulletin 14:

McGuire Coal.

Coal	22″
Cannel coal	5″
Clay	1″
Cannel coal	9″

Altitude, 1,440.

Also is given the following as found in this vicinity:

Mills Coal.

Shale.

Coal	8″
Clay shale	11″
Coal	28″

Altitude, 1,290.

In the right hollow, 2 miles up Brice's Creek, on the right, ¼ mile up the hollow, George Hammond has an unfinished prospect showing the McGuire bed with 4 inches of common coal on 8 inches cannel and with earth covering, at altitude 1,415. Being in the point of a spur a long cut is necessary in order to reach normal thickness.

On a right branch with mouth at altitude 1,010, 1¼ miles up Road Fork, a stripping of thin coal at altitude 1,260 is of the Mills bed.

Hale's Creek.

On the left, 2 miles up Road Fork: Altitude of mouth, 1,020.

Left Fork.—On the left, ½ mile up Hale's Creek: Altitude of mouth, 1,040.

On the right, 1 mile up this fork, John Hale has a wet entry of the following section at its mouth:

McGuire Coal.

Shale	5 Feet
Coal	8″
Shale	8″
Coal	30″
Shale about	18″
Coal about	24″

Altitude, 1,365.

The upper seam of coal and parting are not mined. A good area of this coal is available here, the hills being some 200 feet higher.

Right Fork.—On the right, ½ mile up Hale's Creek: Altitude of mouth, 1,040.

On a right branch with mouth at altitude 1,045, ⅛ mile up this fork, on the left, ½ mile up the branch and at the mouth of its right fork, W. T. Carnes has a closed entry into the Dean coal, at altitude 1,305, having over 30 inches of coal (possibly 36 inches) under 3 feet of shaly and then 5 feet of massive sandstone.

Forks ¾ mile up Right Fork are at altitude 1,125. Thence on the left, ½ mile up the Left Fork, Mrs. Hale has a long entry with the following bed-section 1 yard in:

Dean Coal.

Shaly sandstone	3 Feet
Sandy shale	6 Feet
Coal	30″

Altitude, 1,310.

Some of this coal looks like bone coal, but proves in burning an excellent splint coal: some of irregular fracture and soft, is probably good looking coal. The roof is especially good here.

At the head of a hollow on the right, 2⅛ miles up Road Fork, John Hammond has a 6-yard entry, at altitude 1,460, having, under sandstone, 24 inches of coal, including 2 to 4 inches of bone coal 6 inches from the top. This is of the McGuire bed.

Hinkle Branch.

On the left, 3½ miles up Road Fork: Altitude of mouth, 1,035.

On a left branch, 1½ miles up Hinkle Branch, on the left, ¼ mile up the branch, Grant Mills has a closed 8-yard entry into the Dean coal, at altitude 1,350, under 10 feet of shale, which, according to a private report, has 25 to 34 inches of coal.

Meadow Branch.

On the right, 4 miles up Road Fork: Altitude of mouth, 1,040.

On the right, ¼ mile up this branch (on its left fork), W. O. Clark has an 8-yard entry, with a following section at its mouth. On the left of a left drain into the same fork and ½ mile up the branch, he has a 15-yard entry at altitude 1,350, its bed-section 1 yard in also following:

Dean Coal.

Sandstone	5 Feet
Shale	1 Foot
Coal	9″
Shale	8″
Coal	2″
Black slate	6″
Shale	1½ Feet
Coal (reported)	8″

Altitude, 1,350.

Howard Coal.

Sandstone	5 Feet
Coal	18″
Black slate	7″
Fire-clay	1 Foot

Altitude, 1,065.

Milton Jackson Branch.

On the right, 5 miles up Road Fork: Altitude of mouth, 1,050.

A row of closed entries on the left, ⅛ mile up the branch, with black slate roof under sandstone, and with coal originally reported 27 inches thick, are of the Howard bed at altitude 1,075.

No other openings are now known on this branch, those following being taken from notes of 1894, with present correlations.

Near the mouth of the branch the Mills coal, 20 inches thick, was found at altitude 1,210. Higher on the hill a prospect gave the following:

McGuire Coal.

Sandstone.	
Shale	2″
Coal	2″
Shale	2″
Coal	15″
Cannel slate	21″

Altitude, 1,390.

A broad bench and stain of coal above the opening, at altitude 1,625, indicate the place of the Haddix coal.

A quarter-mile up the branch coal at altitude 1,320 and a coal stain at an uprooted tree, altitude 1,410, give 90 feet as the interval between the Dean and McGuire coals, considerably larger than found elsewhere, but probably nearly correct for this place.

In a hollow behind a house 1 mile up the branch, north of and 190 feet above the head of the hollow, a prospect gave the following:

Dean Coal.

Coal	17″
Shale	4″
Coal	8″
Shale with coal	20″
Coal	8″

Altitude, 1,300.

Bell Fork (Mill Creek).

On the left, 5 miles up Road Fork: Altitude of mouth, 1,050.

In a left hollow, ⅛ mile up this fork, on the right, ⅛ mile up the hollow, Obi Mills has a 4-yard entry with the following bed-section 1 yard in, the bottom foot in water and not seen:

Dean Coal.

Sandstone	4 Feet
Coal	1″
Sandstone	18″
Coal	25″

Altitude, 1,335.

The mouth of an entry on the right, at the forks, ¼ mile up Bell Fork, shows the Howard coal, 20 inches thick, at altitude 1,080, under 20 feet of shale and then sandstone.

HURRICANE FORK.—On the left, 1¾ miles up Bell Fork: Altitude of mouth, 1,090.

On the right, ¼ mile up this fork, Mrs. Jordan has a 4-yard entry with the following bed-section at its face:

McGuire Coal.

Sandy shale	4 Feet
Coal	1″
Shale	2″
Coal	13″

Altitude, 1,430.

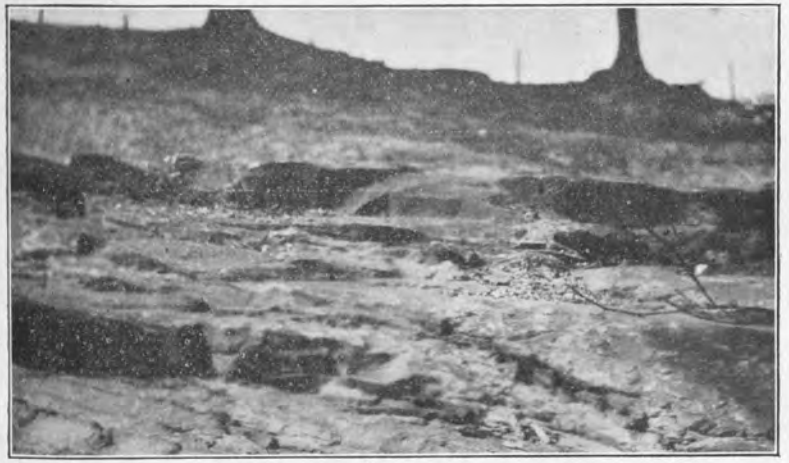
On the left, 2¼ miles up Left Fork, Joseph Smith has a 3-yard entry in which are the upper two coal seams of the following section:

Dean Coal.

Shaly sandstone	5 Feet
Coal	1″
Shale	6″
Coal	15″
Shale	1 Foot
Coal	6″

Altitude, 1,340.

The altitude of this opening as now obtained is 140 feet higher than as given in a report on Goose Creek coals, and the gap at the head of Left Fork, 2⅜ miles up, is now calculated to be at altitude 1,240. Correlations on Goose Creek waters are not affected by the correction as there were no other coal openings found in that vicinity.



NEAR CREST OF FLAT LICK ANTICLINE.
Thick bedded, red faced sandstones lie within one hundred feet of the crest of this structure have been raised to the surface and are dipping generally at an angle of 10 degrees to the northeast. The local structural height of these sandstones is somewhat in excess of 100 feet. The view is in the road ½ mile from Flat Lick. Photo by W. R. Jillson, May 16, 1919.

ANDERSON FORK.—On the right, ¼ mile up Bell Fork: Altitude of mouth, 1,055.

On the right, ½ mile up this fork, Jefferson Mills has an 8-yard entry with the following bed-section at its face, the coal dirty-looking and with clay in its seams:

Dean Coal.

Sandstone	5 Feet
Coal	15″
Shale	1″
Coal	10″
Btiumnous shale	5″
Coal	3″

Altitude, 1,385.

Anderson Fork has forks at the school house 2 miles up, where its altitude is 1,135. One-half mile up the right fork there, and thence on the right, ¼ mile up a right branch, Robert Broughton has an entry with the following bed-section 1 yard in, the bottom 8 inches in water and not seen:

Dean Coal.

Shale	8 Feet
Sandstone	1 Foot
Black slate	1½ Feet
Shale	1 Foot
Coal	½"
Sandy shale	2½ Feet
Coal about	38"

Altitude, 1,360.

On the left, 5⅛ miles up Road Fork, the mouth of an entry into Howard bed, at altitude 1,065, shows 20 inches of coal under 10 feet of shale.

On the left, 5½ miles up Road Fork, Perry Mills has a prospect and over it a 5-yard entry, where the following sections were obtained, of the latter at its face:

Dean Coal.

Sandstone	5 Feet
Coal	24"
Black shale and slate	6"
Coal	4"
Fire-clay	1 Foot

Altitude, 1,325.

Prospect.

Coal stain	1 Foot
Covered	1 Foot
Iron ore	2"
Clay	8"
Fire-clay	3"

Altitude, 1,125.

Cave Gap Branch.

On the right, 5¾ miles up Road Fork: Altitude of mouth, 1,060.

A prospect on the right, ¼ mile up the branch, gives the following:

Howard Coal.

Shale	2 Feet
Coal	1 Foot
Shale and fire-clay	3 Feet
Hard sandstone.	

Altitude, 1,075.

Mills (Low Gap or Doe Gap) Branch.

On the right, 7¼ miles up Road Fork: Altitude of mouth, 1,070.

On the left, ½ mile up the branch, Anderson Y. Mills has entries, old and new, into the McGuire bed at altitude 1,300. The earliest measure gave cannel coal 46 inches thick, under shale, and later ones have varied from 44 to 48 inches of cannel and 40 inches of cannel with 5 inches part splint coal upon it.

The bed here is described in Bulletin 14 as "a pocket limited as a workable bed to the ridge between Mills Branch and Dickey (?) Branch on the north."

On the left, ⅛ mile up a left drain with mouth at altitude 1,080, 7½ miles up Road Fork, a 12-yard entry gives the following section, the coal measured at the face:

McGuire Coal.

Cliff sandstone	25 Feet
Covered	30 Feet
Shale	5 Feet
Cannel coal	39"
Fire-clay.	

Altitude, 1,300.

This coal has no horizontal cleavage, blocks of the full thickness being obtainable with little difficulty.

On the right of the same drain, opposite the preceding, the former Davis Bright entry gave 41 inches of cannel coal. My sample of this, analyzed by Dr. A. M. Peter, Chemist of the Survey, gave the following results:

McGuire Coal.

Moisture	1.41
Volatile combustible matter	41.39
Fixed carbon	46.68
Ash	10.52
	100.00
Sulphur	1.05

The coal is of fine appearance and greatly prized by the inhabitants who use it for several miles down Road Fork.

In Bulletin 14 it is stated that the coal here is "in the central part of a lenticle of good cannel which decreases in all directions." It is apparently limited in this ridge, as a mining proposition, to a small area.

Wolf-Pen Branch.

On the left, 7⅞ miles up Road Fork: Altitude of mouth, 1,095.

On the left, ½ mile up the branch, John Matthews has a 2-yard entry into the Dean bed, at altitude 1,255, having 40 inches of coal (showing much marcasite) under 3 feet of shale and then 2 feet of sandstone.

Spruce Pine Branch.

On the left, 8 miles up Road Fork: Altitude of mouth, 1,100.

On the right, ¼ mile up the branch, at Basin spring, a 10-yard entry into the Dean bed, at altitude 1,235, has, 2 yards in, 37 inches of coal, under 2 feet of shaly sandstone and then 15 feet massive.

Broughton Branch.

On the right, 8¼ miles up Road Fork: Altitude of mouth, 1,110.

On the right at the forks, ¼ mile up the branch, the Green Edwards (former Allen) entry into the McGuire bed, at altitude 1,315, has, under 8 feet of sandstone, 37 inches of cannel coal at its mouth and 32 inches at its face. As elsewhere, according to Bulletin 14, this is but a pocket of thick coal, becoming a thin bed, part cannel and part common coal, before going into the main dividing ridge between Stinking and Goose Creek waters, ½ mile farther north. The bed has been pretty thoroughly prospected in this region without discovery of other important pockets of cannel coal.

MILL BRANCH.

On the right, 8 miles up Stinking Creek: Altitude of mouth, 1,005.

An abandoned stripping on the left, ⅛ mile up the branch, altitude 1,020, and entries ¼ mile up, altitude 1,030, the latter showing 15 inches of coal under 4 feet of shale and then 2 feet of sandstone, are in the Straight Creek bed.

On a right branch, with mouth at altitude 1,050, ½ mile up Mill Branch, on the left, ¼ mile up the right branch, Ross Gamble has a 5-yard entry of the following bed-section half way in:

Dean Coal.

Shale	8 Feet
Coal	14″
Clay	4″
Coal	24″

Altitude, 1,640.

There is no indication of the parting being flint clay, but its height above the Straight Creek coal determines its correlation.

On the left, ½ mile up Mill Branch, the following coals occur in outcrop and prospect:

Moss coal	Altitude, 1,125
Coal about 12″	Altitude, 1,095
Coal thin	Altitude, 1,080
Coal 4″	Altitude, 1,075

The prospect gives a following section, with which is given that of B. B. Williamson's long entry, 2 yards in, on the right ⅝ mile up Mill Branch:

Moss Coal.

Prospect.		Entry.	
Shale	4 Feet	Shale	2 Feet
Coal	5″	Coal	27″
Shale	2½ Feet	Fire-clay.	
Coal about	20″	Altitude, 1,125.	

Altitude, 1,125.

MEADOW BRANCH.

On the right, 8¼ miles up Stinking Creek: Altitude of mouth, 1,005.

On the left, ¼ mile up the branch, thin coal of the Straight Creek bed is in outcrop at altitude 1,045.

On the right, ¼ mile up, John Williamson has a wet entry into the Moss bed, at altitude 1,115, having, at its mouth, 32 inches of coal under 10 feet of shale.

A coal stain and prospect at altitudes 1,040 and 1,050, on the left, beside the road, 8½ miles up Stinking Creek, are of coal seams over the Straight Creek bed. One of these shows again in outcrop by the road 8¾ miles up the creek, at altitude 1,050, with 12 inches of coal under 20 feet of sandstone.

On the left, 9¼ miles up the creek, an entry has the following section at its mouth:

Moss Coal.

Shale	10 Feet
Coal	14″
Black slate	7″
Fire-clay.	

Altitude, 1,090.

A hard, cross-bedded sandstone is exposed 5 to 30 feet under the entry. Possibly this is the same as that supposed to be an upheaval, 1¾ miles up Moore's creek.

Some 50 yards northeast of this entry is another into the same bed 10 feet lower.

A stripping in a right drain, 9¼ miles up the creek, on the right, ⅛ mile up the drain, shows coal, of the Moss bed, 15 inches thick, under 3 feet of shaly sandstone and at altitude 1,080.

An outcrop on the left, by the road, 9⅜ miles up the creek, shows 8 inches of coal under 10 feet of sandstone at altitude 1,035. This is evidently the same as that in outcrop 8½ miles up, indicating a northeasterly dip of 20 feet or more per mile.

MIDDLE FORK.

On the left, 9½ miles up Stinking Creek: Altitude of mouth, 1,010.

On the left, ⅛ mile up this fork a thin coal under 4 feet of shale is of the Moss bed.

On a left branch with mouth at altitude 1,010, ⅜ mile up the fork, ¼ mile up the branch to its forks, and on the right, ¼ mile up the left fork, Robert Smith has an abandoned entry with the following approximate section at its mouth:

Mills Coal.

Shale	1 Foot
Coal	4″
Clay	2″
Coal	26″

Altitude, 1,370.

At J. M. Bingham's, ¾ (?) mile up Middle Fork, the following section is shown, taken from Bulletin 14:

Haddix Coal.

Coal	3″
Cannel coal	13″
Coal	24″

Altitude, 1,670.

On the left, at a water mill, 1 mile up the fork, the following section is exposed at the mouth of a closed entry:

Howard Coal (Lower Split).

Shale	15 Feet
Coal	1½ Feet
Shale	1½ Feet
Coal	1 Foot

Altitude, 1,030.

On the left, 1¼ miles up the fork, Edward Gray has a long entry into the lower split at altitude 1,025, having 20 inches of coal 5 yards in, under 8 feet of sandstone.

On the right, 1¼ miles up, former openings into the two splits of the Howard bed, at altitudes 1,025 and 1,070, indicate coal less than 2 feet thick in each.

Holly Branch.

On the left, 1½ miles up Middle Fork: Altitude of mouth, 1,020.

An outcrop, ½ mile up this branch, formerly showed 24 inches of coal in shale at altitude 1,220. The McGuire bed was found at the head of the branch at altitude 1,460, 40 feet above the gap to Brice's Creek.

John's Branch.

On the right, 2 miles up Middle Fork: Altitude of mouth, 1,020.

No coal is reported opened on this branch, but it gives the road to openings on the local branch, which furnish most of the local supply of coal to beyond the mouth of Middle Fork.

Brown Branch.

On the left, 2⅛ miles up Middle Fork: Altitude of mouth, 1,025.

On the right at the forks, ½ mile up the branch, two 1-yard entries into the Mills bed, at altitude 1,240, have 14 inches of coal under 10 feet of shale.

On the right, 2⅛ miles up Middle Fork, is the following section at the mouth of a long entry:

Howard Coal.

Shale	2 Feet
Coal	8″
Shale	6″
Coal	8″
Shale	6″
Sandstone	4 Feet
Coal	24″
Shale	1 Foot
Covered	3 Feet

Hard sandstone in fork.

Altitude, 1,030.

The 4-foot sandstone parting is increased to 7 feet 50 yards down stream and to 8 feet of sandstone and shale 20 yards up stream.

On the left, 2½ miles up the fork, Thomas Hammond has an 8-yard entry with the following bed-section at its face:

Howard Coal.

Shale	5 Feet
Coal	9″
Shale	4″
Coal	18″

Altitude, 1,045.

Hammond Branch.

On the right, 2¾ miles up Middle Fork: Altitude of mouth, 1,030.

At the head of a right drain, ¼ mile up the branch, T. B. Hammond has a 2-yard entry with a following section at its face.

A short distance farther up the branch a 10-yard entry gave a following section, reproduced from Bulletin 14:

Haddix Coal.

Two-Yard Entry.

Soft shale.	
Coal	16″
Shale with coal	11″
Coal	3″
Shale	2″
Coal	7″
Shale	2″
Coal	26″
Cannel coal	6″
Black slate.	

Altitude, 1,645.

Ten-Yard Entry.

Coal	17″
Clay and clay shale	10″
Coal	12″
Cannel coal	1″
Coal	26″
Cannel coal	2 to 4″

Altitude, 1,670(?).

The upper 3 inches of the cannel coal of the short entry sticks tightly to the lower 13 inches of the 26-inch seam of soft coal. The gap to John's Branch is 80 feet below that entry.

On the right, ¾ mile up Hammond Branch, an opening into coal possibly 2 feet thick, under 8 feet of shale and at altitude 1,220, is of the Mills bed.

Salt Gum Fork.

On the right, 3¼ miles up Middle Fork: Altitude of mouth, 1,040.

On the left, ¼ mile up this fork, W. A. Hubbard has a 12-yard entry with the following bed-section at its face:

Mills Coal.

Sandstone	2 Feet
Coal	14″
Black slate	2″
Shale with coal	8″
Clay	16″
Coal	13″

Altitude, 1,235.

Tom's Branch.—On the left, 1½ miles up Salt Gum Fork: Altitude of mouth, 1,070.

A prospect on the right, ⅛ mile up the branch, into thin coal, at altitude 1,160, is of an unrecognized bed.

On the right, ¼ mile up the branch, Finley Mills has a long entry with the following bed-section 2 yards in:

Mills Coal.

Sandstone	10 Feet
Coal	16″
Black slate	4″
Shale with coal	22″
Coal	18″

Altitude, 1,270.

Bulletin 14 gives the following section as on Tom's Branch:

McGuire Coal.

Slate	9″
Cannel slate	5″
Cannel coal	11″

Altitude, 1,445 (?).

Wash Branch.—On the left, 1¾ miles up Salt Gum Fork: Altitude of mouth, 1,080.

On the left, ¼ mile up the branch, Robert Bargo has a wet entry with the following section at its mouth:

Mills Coal.

Sandstone	8 Feet
Coal	14″
Black slate	3″
Shale with coal	2 Feet
Coal (in water)	14″(?)

Altitude, 1,265.

Bulletin 14 gives the following section as on Wash Branch:

McGuire Coal.

Slate	18″
Cannel slate	5″
Cannel coal	9″

Altitude, 1,465 (?).

Right Fork.—On the right, 2 miles up Salt Gum Fork: Altitude of mouth, 1,090.

Thin coal shows at the mouth of the fork, at altitude 1,100, possibly the upper split of the Howard coal.

Bulletin 14 gives the following section from an entry on this form:

McGuire Coal.

Slate	24″
Bituminous sandstone	18″
Cannel Coal	6″
Clay	15
Coal	8 to 12″

Altitude, 1,465 (?).

On the left, ¾ mile up this fork, Robert Bargo has an 8-yard entry with the following bed-section at its face:

Haddix Coal.

Sandstone.	
Shale	5 Feet
Coal	10″
Shale—knife-edge.	
Coal	9″
Black slate—knife-edge.	
Coal	18″
Black slate	3″
Shale	2 Feet

Altitude, 1,645.

The coal is fine-looking block coal of rather small mining area in this vicinity, though the hills appear to be 150 to 200 feet higher.

Jeff (Jeff Hammond) Fork.

On the left, 3¼ miles up Middle Fork: Altitude of mouth, 1,040.

Bulletin 14 states the McGuire coal on this fork, at altitude probably about 1,425, to be thin and including 6 to 8 inches of cannel coal.

On a right branch, 1¼ miles up the fork, on the right, ¼ mile up the branch, James Mills has a 15-yard entry with the following bed-section half way in:

Haddix Coal.

Massive sandstone	5 Feet
Coal	17″
Knife-edge parting.	
Coal	9″

Altitude, 1,610.

From this point a 2% dip to the north is necessary to bring the bed to the Haddix upper entry, 480 feet lower, on Mill Creek of Goose Creek.

ROLLING FORK.

On the right, 11 miles up Stinking Creek: Altitude of mouth, 1,030.

A stripping on the right, ¾ mile up this fork, may have the following section:

Moss (?) Coal.

Shale	4 Feet
Coal	14″
Clay (reported about)	18″
Coal (reported about)	30″

Altitude, 1,090.

A prospect on the right, 11½ miles up Stinking Creek, has 8 inches of coal, probably of the rider to the Moss bed, under 2 feet of sandstone and at altitude 1,095.

On the left, 12¾ miles up the creek, C. Messer has a wet entry with the following section at its mouth:

Haddix Coal.

Shaly sandstone	4 Feet
Coal	16″
Clay	6″
Cannel coal	11″

Altitude, 1,680.

The top of a prominent cliff under the McGuire bed here is at altitude 1,510.

A private report gives the following section as on the Susan Taylor place. It is on the left of Lost Fork, at its mouth, and on the right of Stinking Creek, ⅛ mile above Lost Fork, or 13⅛ miles up the creek.

The correlation is now added, the altitude being derived from its stated height of 200 feet above the creek:

Mills Coal.

Sandstone.	
Slate.	
Coal	thin
Soft parting	thin
Coal	33″
Shale.	

Altitude, 1,340.

On the left, 13¼ miles up Stinking Creek, C. Messer has a 2-yard entry in which is the following bed-section:

Haddix Coal.

Shaly sandstone	3 Feet
Coal	13″
Clay shale	6 Feet
Coal	7″
Cannel coal	25″
Coal	3″

Altitude, 1,645.

The cannel coal here is fine looking and light in weight, but the area of the bed is narrow, there being hardly 100 feet of covering over it.

LAUREL BRANCH.

On the left, 13½ miles up Stinking Creek: Altitude of mouth, 1,080.

On the left, ¼ mile up the branch, 15 feet above it, a stripping shows 8 inches of coal, a part of the Howard bed at altitude 1,125, under 8 feet of sandstone.

Above the stripping the top of a 15-foot cliff under the McGuire bed is at altitude 1,470.

Above the cliff Silas Baker has a wet entry of the following bed-section 2 yards in:

McGuire Coal.

Massive sandstone	5 Feet
Cannel coal	18″
Clay	3″
Coal	12″

Altitude, 1,645.

The upper 14 inches of the cannel coal is in one block, the upper half of which is altogether too heavy for good coal.

On the left, ¾ mile up the branch, 90 feet above it, a stripping, on a broad bench clearly due to the cliff sandstone just noted, gives the following section:

McGuire Coal.

Shale with sandstone	8 Feet
Black slate	2″
Coal	4″
Black slate	2″
Coal	2″
Shale	7″
Coal	3″
Shale	1″
Coal	8″
Shale and coal	3″
Shale	7″
Coal	5″
Shale	2″
Coal	2″
Shale	2″
Coal	6″

Altitude, 1,450.

Total thickness of coal 30 inches; of bed 56 inches.

The top of the cliff sandstone is at altitude 1,435, one mile up the branch. Up to this point the stream bed rises with remarkable rapidity, as compared with other branches heretofore mentioned, but on attaining the top of the sandstone the stream bed is almost level.

On a right branch, 1⅛ miles up Laurel Branch, on the left, ⅛ mile up the right branch, Newton Smith has a 3-yard entry with the following bed-section at its face:

McGuire Coal.

Sandstone	5 Feet
Coal	5″
Shale	7″
Coal	5″
Shale	8″
Coal	6″
Shale	4″
Coal	5″
Fire clay	1 Foot

Altitude, 1,430.

On the left, 1½ miles up the branch, 25 feet above it, an unfinished prospect gives the following:

McGuire Coal.

Earth.	
Slaty cannel coal	4″
Clay	8″
Coal	18″

Altitude, 1,430.

On the right, 13⅝ miles up Stinking Creek, J. E. Mills has a wet entry with the following bed-section 6 yards in:

Dean Coal.

Sandstone	10 Feet
Coal	8″
Bituminous shale	2″
Coal	10″
Clay	1″
Bone coal	1″
Coal	13″

Altitude, 1,335.

The bone coal appears as bituminous shale at the outcrop. The altitude appears to be too low.

BEATTY BRANCH.

On the right, 14 miles up Stinking Creek: Altitude of mouth, 1,090.

On the left, ¼ mile up the branch, J. E. Mills has a 4-yard entry with the following bed-section at its face:

Dean Coal.

Sandy shale	3 Feet
Coal	6″
Shale	2″
Coal	3″
Black jack	2″
Coal	6″
Black jack	1″
Coal	10″

Altitude, 1,365.

A prominent bench above the entry, at altitude 1,410, is perhaps 20 feet below the McGuire bed, and the top of a 20-foot cliff at altitude 1,610 close below the Haddix bed.

BUCKEYE CREEK.

On the left, 15 miles up Stinking Creek: Altitude of mouth, 1,105.

According to Bulletin 14, the McGuire bed has 13 inches of cannel coal on this creek, but no data are given as to its height there.

On the right, 15½ miles up Stinking Creek: Altitude of mouth, 1,120.

On the left, 1 mile up the fork, a closed entry gave the following bed-section 1 yard in:

Dean Coal.

Sandstone	8 Feet
Shale	1″
Coal	12″
Shale about	2″
Coal	(?)

Total thickness, 5 yards in, less than 5 feet.

Altitude, 1,355.

On a left branch, 1¼ miles up Trace Fork, on the right, ¼ mile up the branch, Warren Bowen has a 15-yard entry, not yet in solid coal, with the folloiwng bed-section at its face:

Dean Coal.

Shale	5 Feet
Sandstone	1 Foot
Shale	3 Feet
Coal	4″
Shale	3″–0″
Coal	15″
Shale	3″–6″
Coal	3″–5″
Shale	2″–6″
Coal	20″–22″

Altitude, 1,380.

The total thickness of the bed is between 4 and 4½ feet, and this is said to be the best of several now closed openings of the neighborhood.

ACORN FORK.

On the left, 15¾ miles up Stinking Creek: Altitude of mouth, 1,125.

Left Fork

On the left, ¾ mile up Acorn Fork: Altitude of mouth, 1,200.

On a left drain, ¾ mile up this fork on the left, ⅛ mile up the drain, a prospect gives a following section.

Second Left Fork:—On the left, 1 mile up Left Fork: Altitude of mouth, 1,395.

On the right, ¼ mile up this second fork, a prospect gives a section following:

McGuire Coal.

First Left Fork.		Second Left Fork.	
Sandstone.		Sandstone	5 Feet
Coal	6″	Coal	1″
Shale	6″	Clay	1″
Coal	4″	Shale	2 Feet
Fire clay	1 Foot	Coal	9″
Altitude, 1,460.		Fire clay	2″
		Coal	3″
		Shale	6″
		Altitude, 1,420.	

Right Fork.

On the right, ¾ mile up Acorn Fork: Altitude of mouth, 1,200.

On the left, ¾ mile up this fork, a stripping gives the following section:

McGuire Coal.

Sandstone	10 Feet
Shale	5 Feet
Black slate	1″
Shale	5″
Coal	1″
Black slate	11″
Semi-cannel coal	8″
Altitude, 1,410.	

On the left, 100 yards farther up, J. E. Mills has a 4-yard entry into the same bed, at altitude 1,420, having, at its mouth, 21 inches of what looks like an extra fine gas coal, on fire-clay and under 3 feet of sandstone.

Bulletin 14 has 13 inches of cannel coal on Acorn branch, but without definite location or height.

A stripping on the right, 16¾ miles up Stinking Creek, altitude 1,170, has 8 inches of coal under 10 feet of sandstone and shale. This is of the Mills bed.

On the left, 17 miles up the creek, a now closed entry on the former Isaac Taylor place gave the following sections as measured in 1894 and again as given in Bulletin 14.

McGuire Coal.

1894.		Bulletin 14.	
Shale	5 Feet	Shale.	
Coal and shale	7″	Coal	6″
Shale	2 Feet	Cannel coal	8″
Cannel coal	8″	Shale and bone coal	24″
Shale	1½ Feet	Coal	10″
Coal	3″	Altitude, 1,370.	
Shale	4″		
Coal	18″		
Altitude, 1,370.			

JONES FORK (ELLIOTT OR ALEC BRANCH).

On the right, 17¼ miles up Stinking Creek: Altitude of mouth, 1,170.

On a right branch, with mouth at altitude 1,325, 1¾ miles up this fork, on the left, ⅛ mile up the branch, Mrs. Taylor has entries 80 yards apart with sections as follows: The lower is a 25-yard entry, 15 yards in, which its upper coal seam was measured and the rest of its section is from the mouth of the entry. The upper is a 4-yard entry and the section was taken within it:

Dean Coal.

Lower Entry.		Upper Entry.	
Massive sandstone	15 Feet	Sandstone	10 Feet
Coal.		Shale	2 Feet
Shale.		Coal	30″
Coal.		Clay	2″
Knife-edge parting.		Coal	5″
Coal.		Bone coal	2″
Altitude, 1,360.		Coal	4″
		Altitude, 1,360.	

Twelve feet under the lower entry is 12 inches more of coal, most of the interval to the entry being occupied by shale. This coal is a not unusual attendant to this bed.

LAUREL BRANCH.

On the right, 17¾ miles up Stinking Creek: Altitude of mouth, 1,215.

In a right drain ½ mile up the branch, ⅛ mile up the drain, a wet entry gives the following bed-section at its mouth:

Hazard Coal.

Shaly sandstone	4 Feet
Shale	5 Feet
Coal	2″
Black slate	5″
Shale	3 Feet
Coal	2½ Feet

Altitude, 1,635.

A closed entry on the right, 18 miles up the creek, reported to have 32 inches of coal is probably of the Mills bed and is at altitude 1,250.

PIGEON ROOST BRANCH.

On the right, 18¼ miles up Stinking Creek: Altitude of mouth, 1,270.

Plank Branch.

On the right, ⅛ mile up Pigeon Roost Branch: Altitude of mouth, 1,090.

At the head of the right fork of this branch, ⅜ mile up, a prospect gives the following section:

Helton Coal.

Shaly sandstone	3 Feet
Coal	4″
Shale	1 Foot
Sandstone	6″
Shale	1 Foot
Coal	4 Feet

Altitude, 2,025.

The bottom 6 inches was not seen. With less than 100 feet covering the area of the bed is insignificant here. The altitude obtained here differs only 25 feet from that obtained at the Helton opening near the head of Middle Fork, Kentucky River.